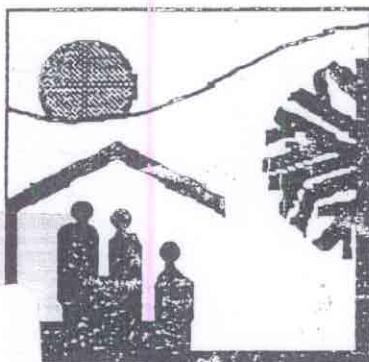




Environmental Impact Analysis Process



SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
TAURUS
STANDARD SMALL LAUNCH VEHICLE PROGRAM
VANDENBERG AIR FORCE BASE, CA
MAY 1993

DEPARTMENT OF THE AIR FORCE

REF
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TL
4027
E57
1992
supplement

ENVIRONMENTAL IMPACT ANALYSIS PROCESS

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

TAURUS
STANDARD SMALL LAUNCH VEHICLE PROGRAM
VANDENBERG AFB, CA

Prepared for

Headquarters
Space and Missile Systems Center
Los Angeles AFB, CA

Prepared by

Advanced Plans Directorate
The Aerospace Corporation
El Segundo, CA

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
TAURUS STANDARD SMALL LAUNCH VEHICLE PROGRAM
VANDENBERG AFB, CA

AGENCY: United States Air Force, Headquarters Space and Missile Systems Center (SMC)

COOPERATING AGENCIES: Advanced Research Projects Agency
(ARPA)
United States Air Force Space Command
(AFSPACECOM)

ACTION: Proposed Taurus Standard Small Launch Vehicle Program as described in baseline Environmental Assessment, modified as described under Background.

BACKGROUND: The baseline Environmental Assessment (EA) for the launch program of the Taurus Standard Small Launch Vehicle (SSLV) at Vandenberg AFB was prepared in 1991-92. The FONSI was signed by 30th Space Wing (30SPW) on 14 August 1992 and by SMC on 20 August 1992.

Subsequent to the preparation of that document, and prior to the first planned launch, certain changes to the program have occurred which have potential environmental impact. The attached supplement is to assess these program changes and their environmental impact.

The changes documented and reviewed in the supplement are as follows:

- (1) It is now planned that the launch vehicle processing will occur in the Missile Assembly Building (MAB) on North Vandenberg AFB.
- (2) The final EA stated that Taurus would not be launched during the least tern nesting season from mid-April to the end of August. Since then, the Western Snowy Plover has been added to the federal Threatened list under the Endangered Species Act, and its nesting season is from mid-March to mid-September. Formal consultations with the U.S. Fish and Wildlife Service (USFWS) have resulted in a no jeopardy opinion, stating that Taurus is allowed to launch once during the combined nesting period, subject to compliance with certain mitigation requirements.
- (3) The final EA presented a detailed route for the placement and routing of a fiber optics cable from Facility 576E to Facility 1762, and an alternate route to Facility 1681. The use of Facility 1681 has been abandoned, and the routing of the cable to Facility 1762 has been redefined as one of two routes.
- (4) The launch stand design is being modified to provide relief from a predicted severe acoustic environment. The approach is to increase the height of the launch stand.
- (5) Due to schedule conflicts, the payloads may not be processed in Building 1610, which was covered in the baseline EA.

Facility 1559 is being considered as an alternative, as is the Payload Processing Room (PPR) at SLC-6. The hydrazine cart planned for use also may be replaced with a different cart borrowed from CCAFS.

SUMMARY:

The implementation of the Taurus program changes described in this EA Supplement will not significantly impact the natural or man-made environment.

The Taurus launch vehicle processing activities planned in the MAB were approved by a Categorical Exclusion (CATEX) which is included in the supplemental EA as Appendix A. This was approved on the basis that there will be no facility modifications to accommodate the program, and that the Taurus vehicle stages contain less propellant than the Peacekeeper stages previously processed safely in the MAB.

The launch of the Taurus vehicle during the least tern and snowy plover nesting season is not anticipated to cause significant effects on these species. As requested by USFWS, certain mitigation steps will be carried out. These are:

- (1) Noise measurements will be performed during, and exhaust plume deposition monitoring after, the first launch.

NOTE: Noise measurement is also a requirement of National Marine Fisheries Service (NMFS) and will be coordinated with both agencies. NMFS also requires behavioral monitoring of pinniped colonies at Purisma Point and Rocky Point.

- (2) Launch during the nesting season will not be performed when the wind is blowing toward the Purisma Point colony (wind direction from 90 to 150 degrees true) to minimize the possibility of acid deposition from the exhaust gases in the colony area. Wind direction will be monitored from SLC-2 or a closer location.
- (3) Visual monitoring of the Southern sea otter population will be performed at the otter colony near Facility 576E shortly before and after the first launch.
- (4) Provide least tern decoys and habitat shelters (roof tiles), and support a USDA Animal Damage Control study of least tern predation and a non-lethal predator control program. Also, a wooden pole used by avian predators will be removed.
- (5) USAF will support a USFWS study into the impacts of noise on avian species, and the least tern/snowy plover monitoring program will be increased in frequency.
- (6) Fencing will be erected around the Purisma Point nesting area prior to the beginning of the 1993 nesting season.
- (7) A western snowy plover monitoring program will be prepared and carried out.

Fiber optics cable will be laid on top of the ground, not trenched in. Therefore, the two fiber optics cable route options do not significantly impact the environment. However, both fiber optics cable routes result in some increase in risk to an archaeological site in the area. To protect the site from disturbance, a qualified Base archaeologist will witness the above ground emplacement and removal of the fiber optics cable.

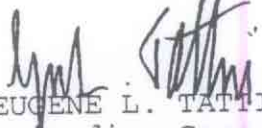
The increase in launch stand height would have no significant environmental effect.

The processing of the payloads is now planned for the SLC-6 Payload Processing Room. Based on the completion of air quality permitting and safety requirements, a review of this facility and its equipment, as well as alternate facilities 1610 and 1559, has identified no significant environmental impacts.

FINDINGS: Based on the findings of this Supplemental Environmental Assessment, and mitigation steps undertaken as a result, a finding of no significant impact is made. A Supplement to the Taurus Environmental Assessment describing the proposed action is on file at:

Department of the Air Force
HQ Space and Missile Systems Center/CEV
Attn: Mr. Andrew Rider
P.O. Box 92960
Los Angeles Air Force Base, CA 90009-2960

APPROVED: SMC Environmental Protection Committee (EPC)


EUGENE L. TATTINI
Brigadier General, USAF
Chairperson, Environmental Protection Committee

**FINDING OF NO SIGNIFICANT IMPACT
CONCURRENCE PAGE**

Taurus Standard Small Launch Vehicle, Vandenberg Air Force Base, California

April 1993

I concur with the Finding of No Significant Impact (FONSI):

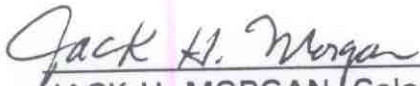
Environmental Protection Committee Approval:



ALEXANDER A. ABELA, Colonel, USAF
Chairman, Environmental Protection Committee
Vandenberg AFB, CA

14 May 1993
Date

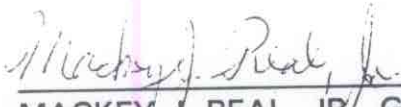
Judge Advocate Approval:



JACK H. MORGAN, Colonel, USAF
Staff Judge Advocate, 30 SPW/JA
Vandenberg AFB, CA

7 May 93
Date

Organization Approval:



MACKEY J. REAL, JR., GM-15
Chief, Environmental Management
Vandenberg AFB, CA

10 May 1993
Date

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ABBREVIATIONS AND ACRONYMS

AFB	Air Force Base
AFSC	Air Force Systems Command
AFMC	Air Force Materiel Command
AFSPACECOM	Air Force Space Command
Al ₂ O ₃	Aluminum Oxide
ATC	Authority to Construct
CATEX	Categorical Exclusion
CCC	California Coastal Commission
CCD	Coastal Consistency Determination
CEV	USAF/SMC Directorate of Acquisition Civil Engineering, Environmental Management Division
DARPA	Defense Advanced Research Projects Agency
dB	Decibels
DFRC	Dryden Flight Research Center
DOPAA	Description of Proposed Action and Alternatives
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EPA	Environmental Protection Agency
EPC	Environmental Protection Committee
ESA	Endangered Species Act
FTLU	TBS
FTS	Flight Termination System
GSE	Ground Support Equipment
HCl	Hydrochloric Acid or Hydrogen Chloride
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
IRP	Installation Restoration Program
LEV	Launch Equipment Van
LSV	Launch Support Van
MAB	Missile Assembly Building
MSA	Multiple Spacecraft Assembly
NASA	National Aeronautics and Space Administration
NMFS	National Marine Fisheries Service
OASPL	Overall Sound Pressure Level
ODC	Ozone-Depleting Chemicals
OSC	Orbital Sciences Corporation
PPSU	Propellant and Pressurant Service Unit
SCAPE	Self-Contained Atmospheric Protective Ensemble
SBCAPCD	Santa Barbara County Air Pollution Control District
SEL	Sound Exposure Level
SMC	Space and Missile Systems Center
STEP	Space Test Experiments Platform
SSLV	Standard Small Launch Vehicle
STS	Space Transportation System (Space Shuttle)
TBD	To Be Determined
TBS	To Be Supplied
USAF	United States Air Force
USFWS	United States Fish and Wildlife Service
VAFB	Vandenberg Air Force Base
VSWR	Virtual Standing Wave Ratio
WR	Western Range
30SPW	30th Space Wing, a unit of USAF Space Command

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

As described in the baseline Environmental Assessment (EA), the Taurus Standard Small Launch Vehicle (SSLV) program is intended to demonstrate a quick reaction, reliable and economical means of providing assured access to space for 1,000 to 3,000 lb. satellites in support of tactical military commanders. The information in this section of the baseline EA is still valid.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The proposed action as presented in the baseline EA remains unchanged with the following exceptions.

2.1 Missile Assembly Building (MAB) Usage

The location for the prelaunch processing of the Taurus stages has been changed from the location at the Hercules plant in Magna, Utah to the MAB on North Vandenberg AFB. The latter facility was built in 1981 for the prelaunch processing of the MX (later renamed Peacekeeper) missile, and was used for prelaunch processing of eight Peacekeeper missiles from 1983 to 1985. In 1987, the MAB was modified to support the Small ICBM Program. It supported that program in 1988 to 1990. The building was also modified in 1988-90 to support Peacekeeper Rail Garrison, but this program was cancelled in 1991 before any launch processing occurred.

2.2 Launch during Least Tern and Snowy Plover Nesting Seasons

The launch of the Taurus T1 mission is planned to occur during the least tern and snowy plover nesting season. The least tern nests between mid-April and the end of August, while the snowy plover nests in the same area between mid-March and mid-September.

2.3 Change in routing of Fiber Optics Cable

As described in the baseline EA, commands and data to and from the launch vehicle on the launch stand at 576E will be routed by copper cable to a Launch Equipment Van (LEV) located outside the fenced complex. From there, the data is routed via fiber optics cable to the Launch Support Van (LSV) at Building 1762 on 13th Street - a distance of about 4.5 miles. Both the copper and fiber optics cables will be laid on the surface of the ground (not trenched in), then recovered after launch. Also, they will be routed along the shoulders of existing roadways (dirt or paved) to minimize disturbance to the area vegetation and topography.

The LEV must be at least 350 feet from the launch vehicle for safety reasons. Also, it is desirable that road crossings of cables be held to a minimum, using cable covers rather than by trenching. This has led to several possible routes for the cable. Figures 2.4a and 2.4b in the baseline EA depict routes to Building 1681 and Building 1762. The use of Building 1681 has been discarded due to its condition - hence Option 1 in Figure 2.4a is no longer valid. Also,

Option 2 (Figure 2.4b) in the baseline EA has been discarded because it requires routing the copper cable across pavement within the fenced pad area. It has been decided to locate the LEV on the north side of Spur Rd., but two options for cable routing from there remain. The resultant two route options are depicted in Figures 2-1 and 2-2 herein. An analysis of this option is presented in Section 4.0.

2.4 Launch Stand Design Change

An investigation into the acoustic environment created by Taurus first stage ignition has led to an investigation into means of mitigating the effect through launch site redesign. The proposed approach is to increase the height of the removable launch stand structure from the baselined 10 feet to approximately 20 feet above the concrete pad. A removable steel flame deflector will also be added beneath the stand.

2.5 Payload Processing Facilities

It is now planned that the payloads will be processed in the SLC-6 Payload Processing Room (PPR). The SLC-6 complex and the PPR is shown in Figure 2-4, with the PPR floor plan as Figure 2-5. This facility was originally built for processing Shuttle payloads, but requires no modifications to support Taurus.

To support Space Test Experiment Platform (STEP) satellite propellant loading, a plan for hydrazine handling in the airlock will be prepared and approved by 30 SPW Safety. The plan shall incorporate the following elements: (a) To protect against hydrazine leakage, a compatible dike will be placed on the airlock floor under the Multiple Spacecraft Assembly (MSA) or a drain pan will be placed to catch leakage. The dike or pan shall be capable of containing all hydrazine being handled. (b) Since the airlock has no provisions for safely handling or exhausting hydrazine vapor in air, the HVAC system will be shut down in the event of a leak or spill because it is not explosion proof. (c) A method for blanketing a spill will be available. (d) Approved vapor detectors, with alarms, will be used. (e) Approved hydrazine aspirator equipment will be available to support cleanup. (f) All personnel will be in Self-Contained Atmospheric Protective Ensemble (SCAPE) suits during loading operations. (g) electric circuits in the vicinity will be either explosion proof, sealed off or de-energized. (h) As part of this plan, a risk assessment will be completed, which will include a toxic hazard corridor.

In addition to Building 1610 (covered in the baseline EA), another alternative payload processing facility is Building 1559 located on Tonto Road approximately four miles from 576E by road. Figure 2-6 presents a floor plan of this facility. A description of the provisions in this facility is provided in paragraph 4.5.

2.6 Alternatives to the Proposed Action

There are no changes to the alternatives to the Taurus Program. Previously identified alternatives are described in the baseline Taurus Environmental Assessment (Reference 1).

Figure 2-1 Fiber Optics Cable Route - Option 1

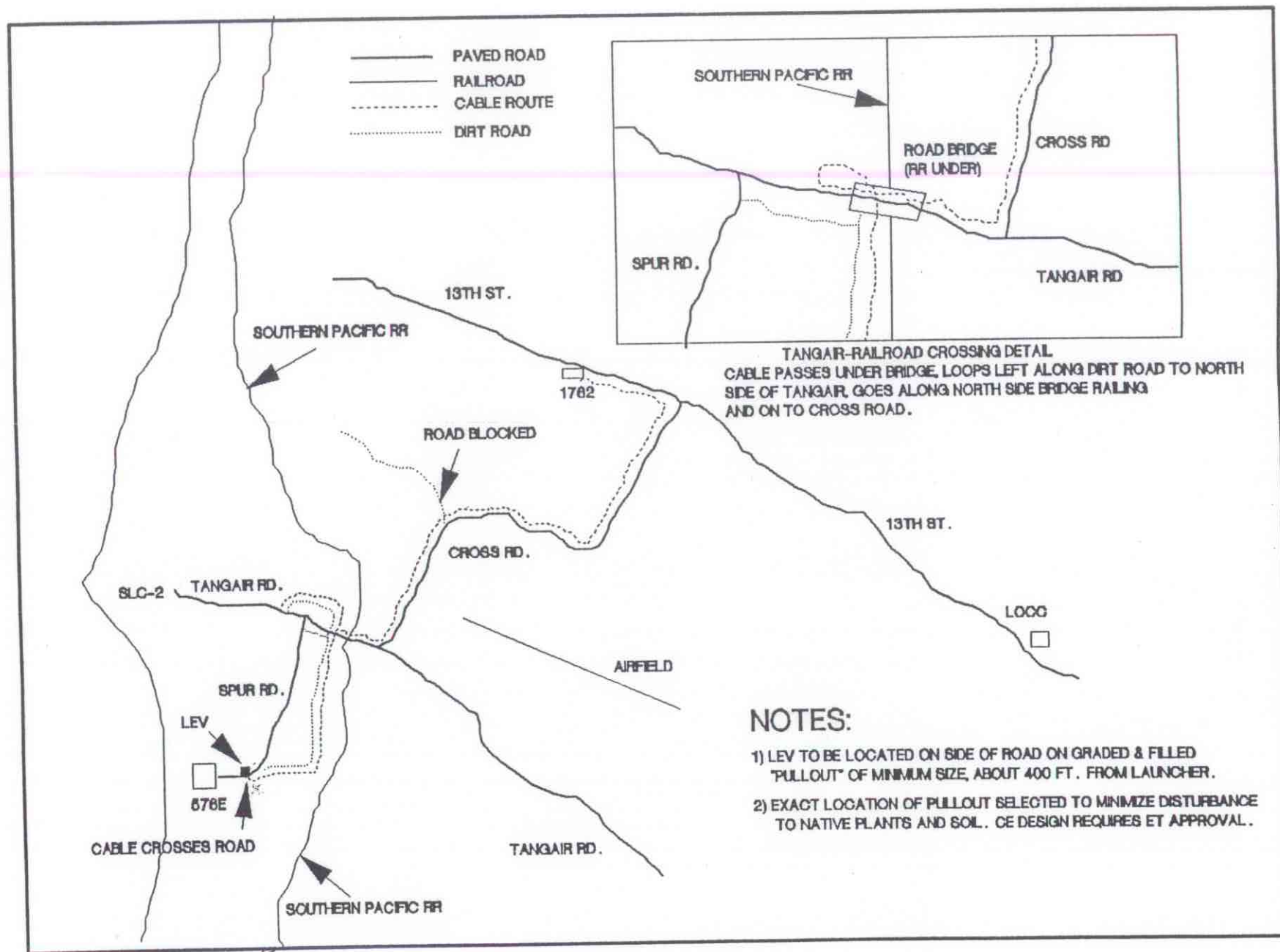
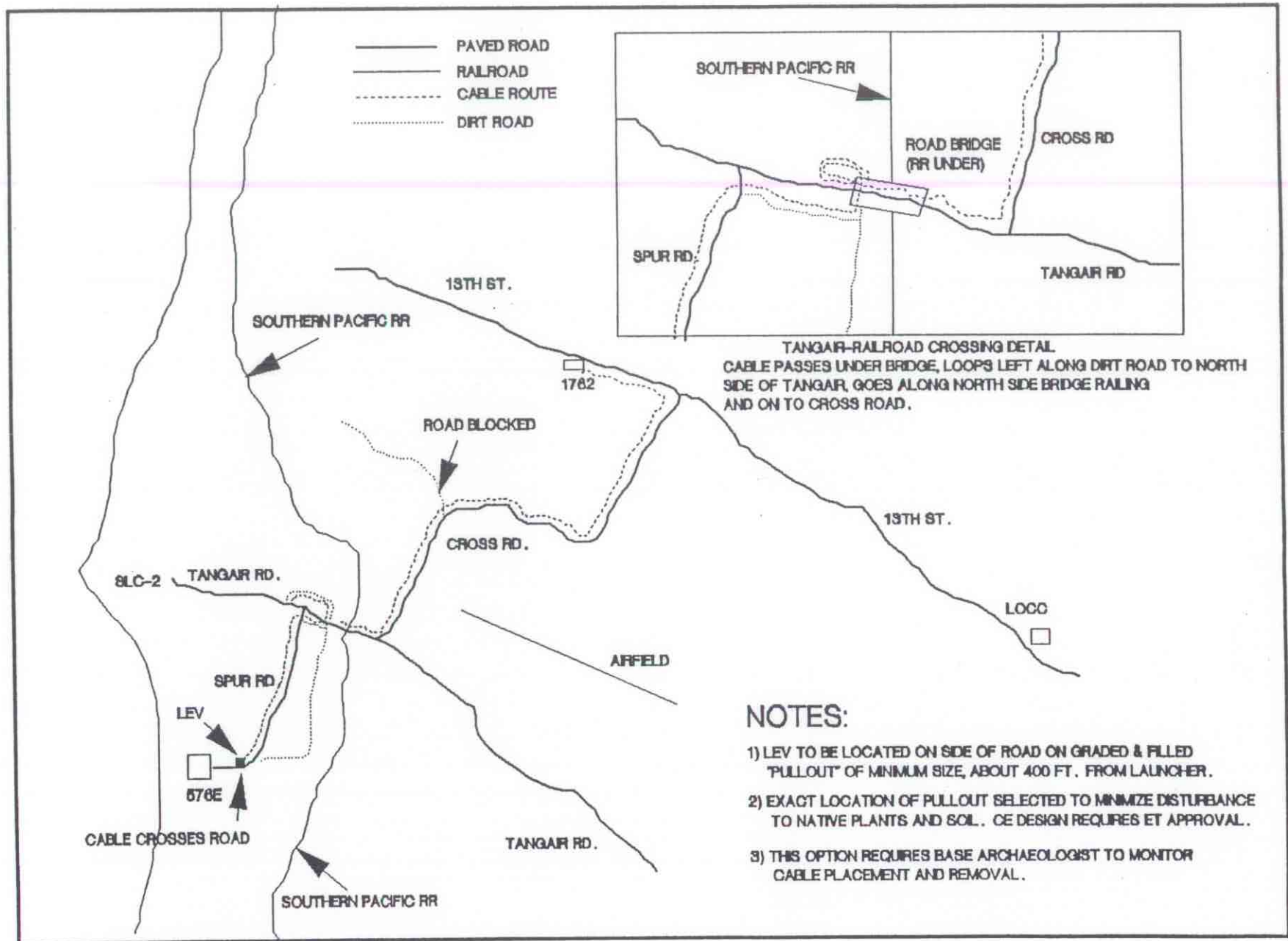


Figure 2-2 Fiber Optics Cable Route - Option 2



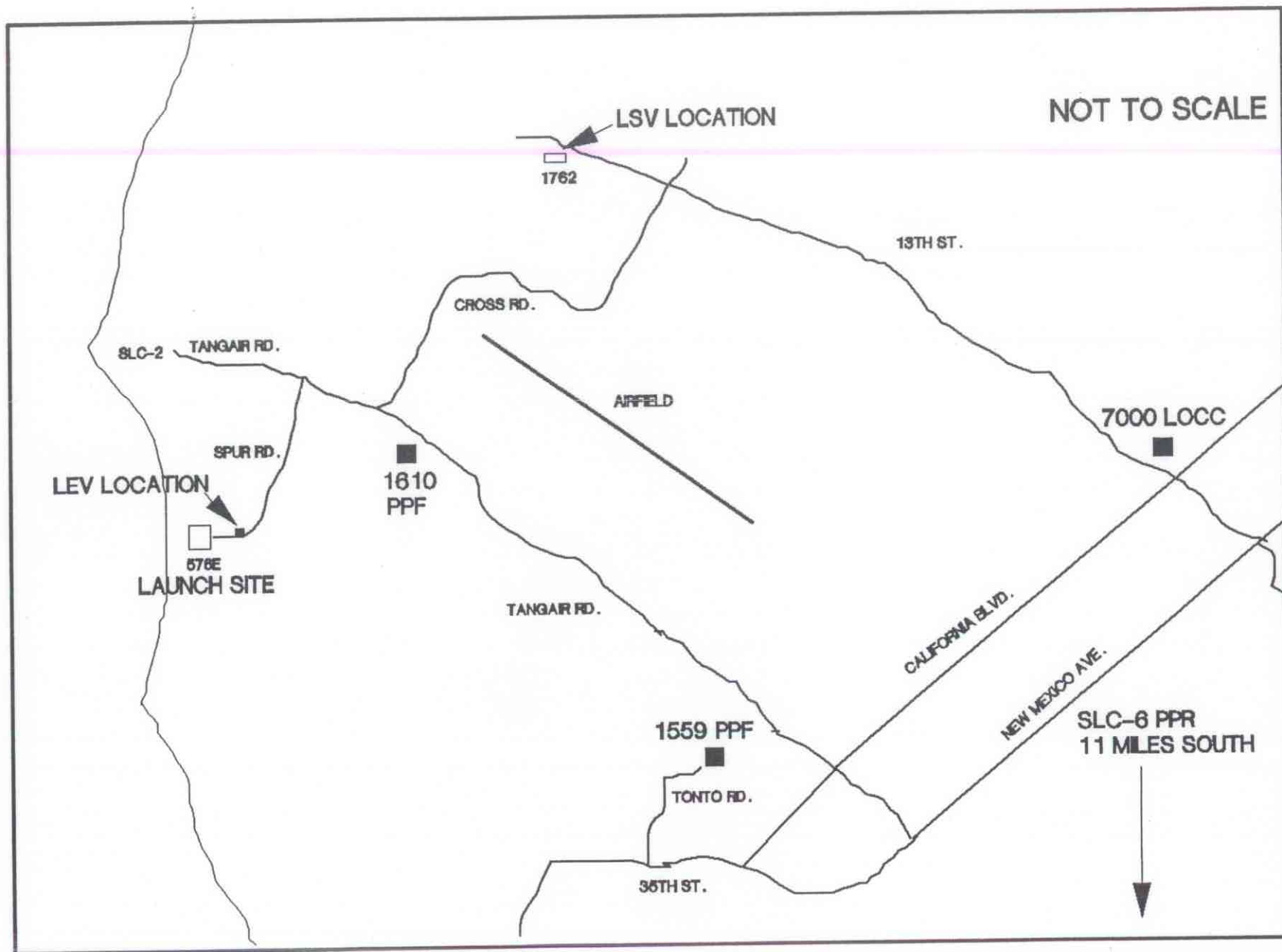


Figure 2-3 Facility Location Map

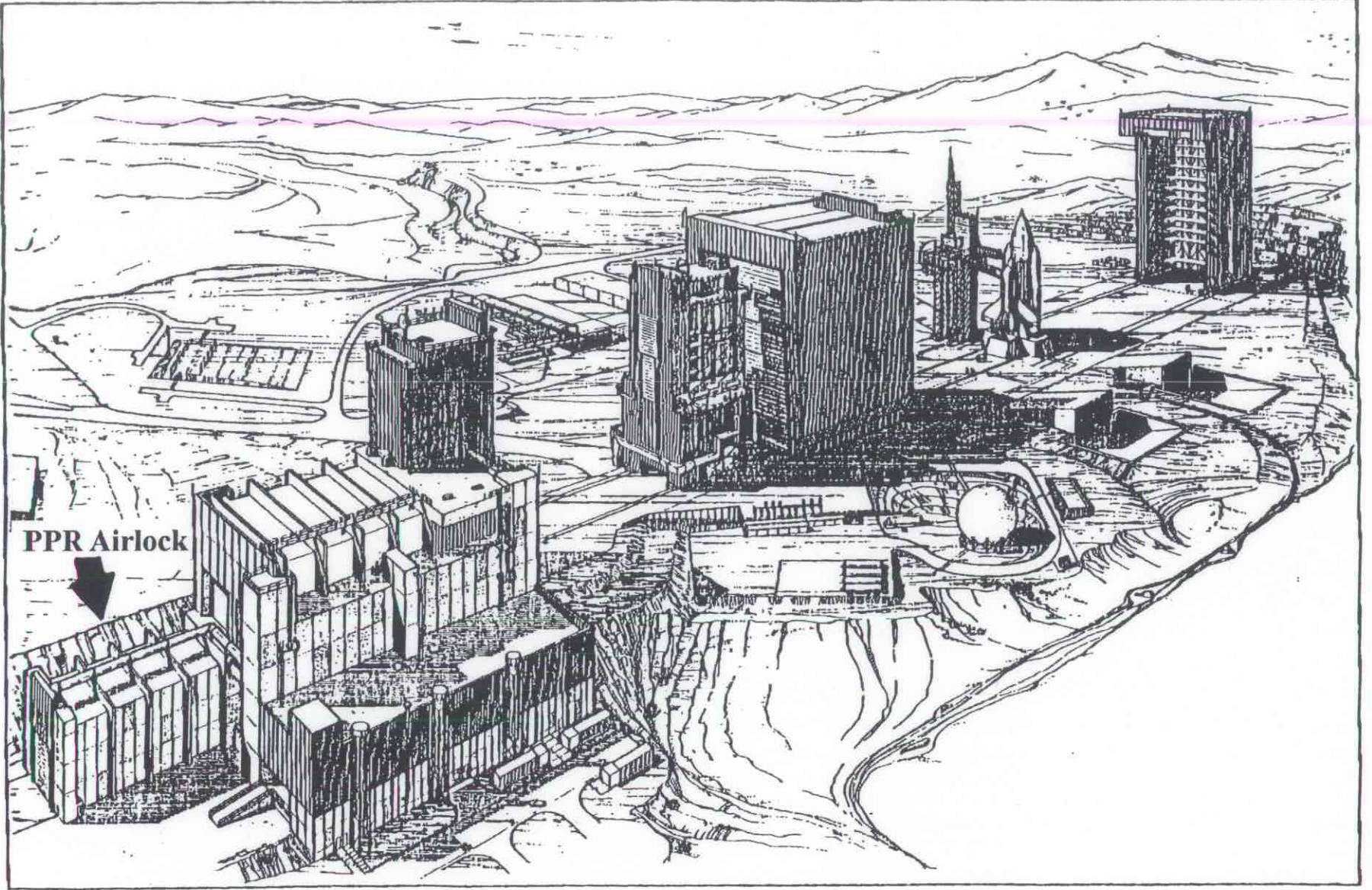
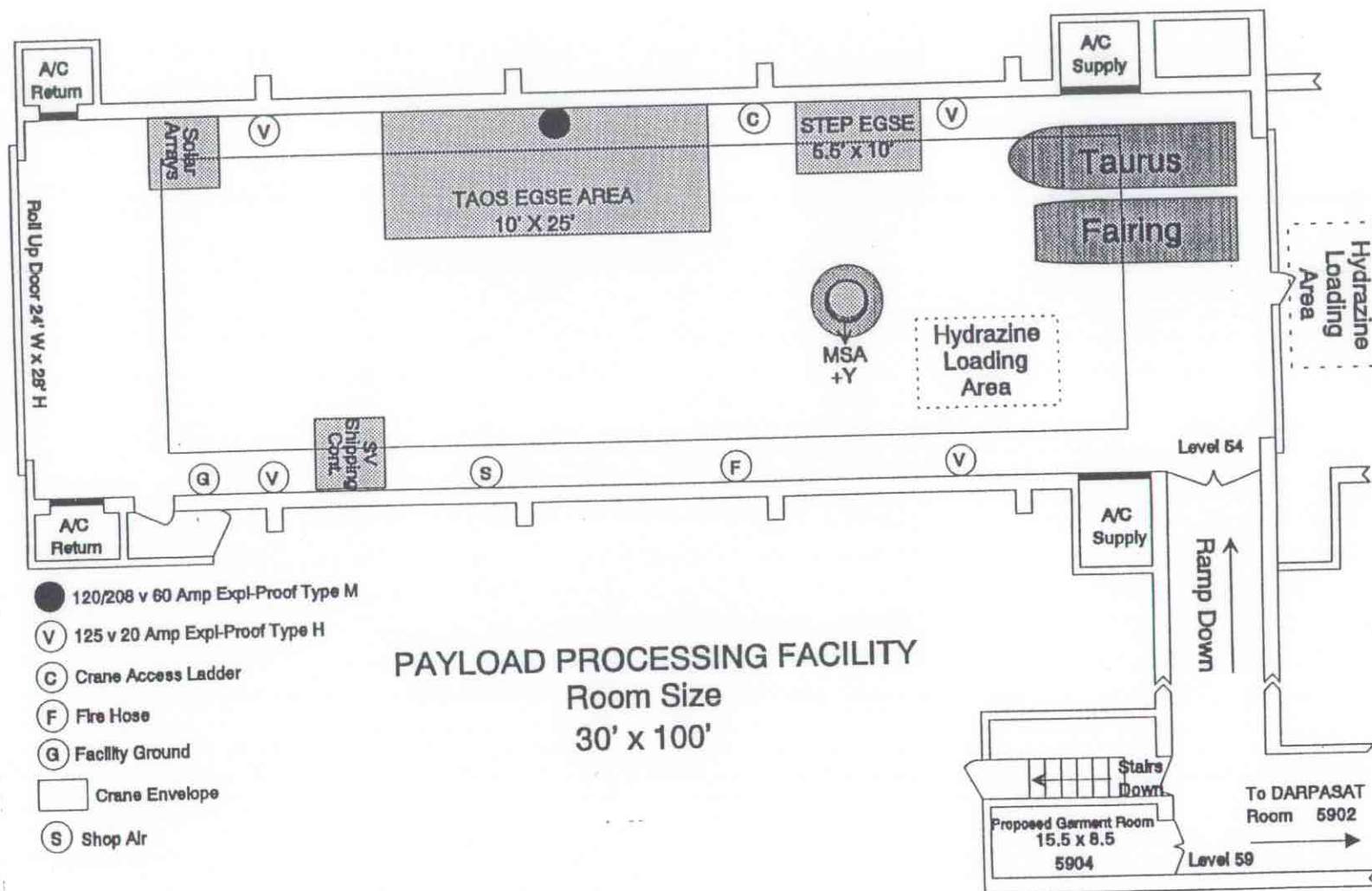


Figure 2-4 Space Launch Complex 6 and PPR

Figure 2-5 Payload Processing Room Floor Plan



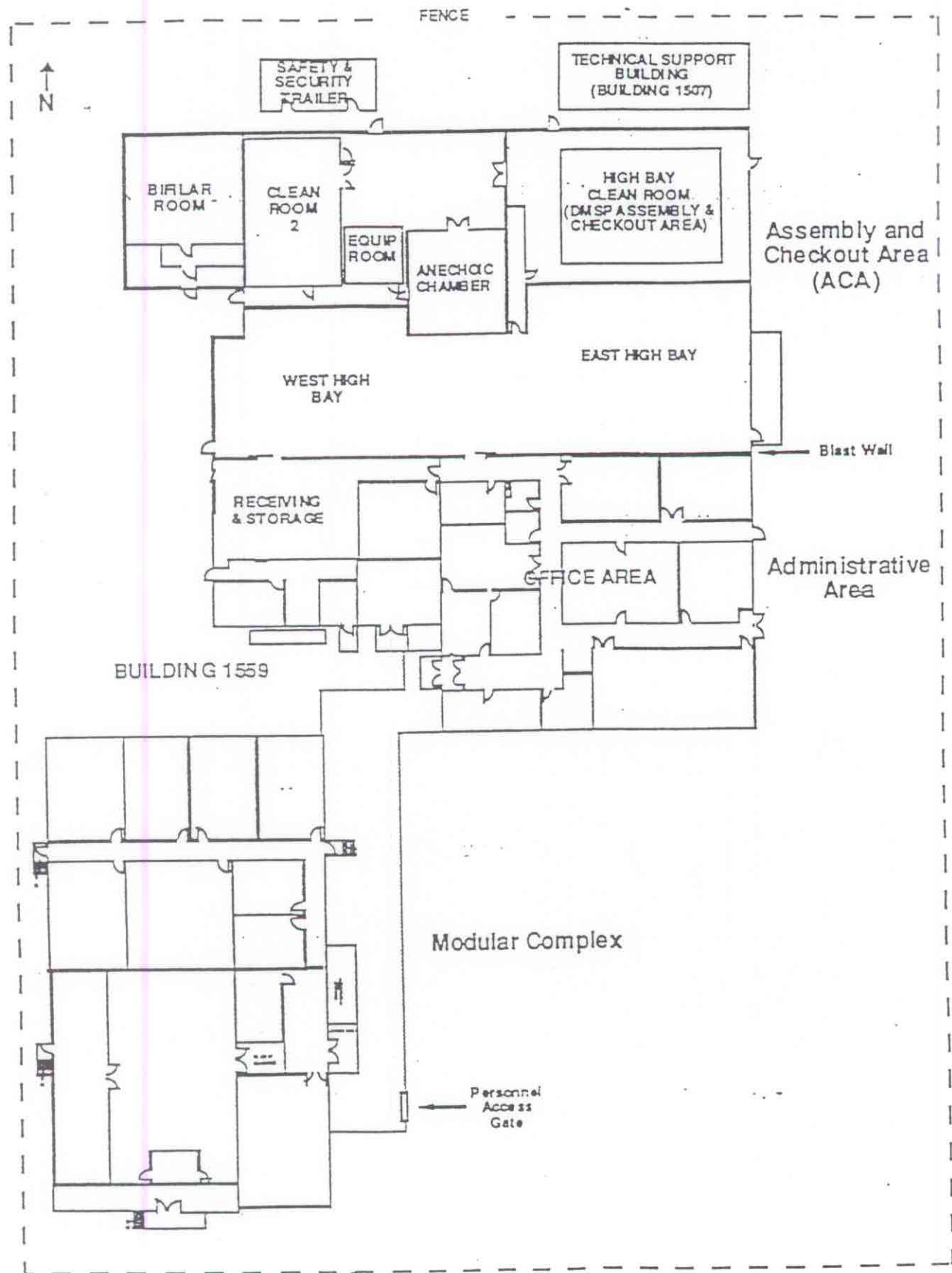


Figure 2-6 Building 1559 Floor Plan

3.0 AFFECTED ENVIRONMENT

Section 3.0 of the Taurus SSLV Environmental Assessment (Reference 1) describes in detail the affected environment for all of Vandenberg AFB, with particular attention to the Facility 576E launch site and Facility 1610 payload processing facility, as well as the area involved in the fiber optics cable routing. The changes represented in this supplement, including the usage of the SLC-6 Payload Processing Room and Building 1559 as an alternative to Building 1610 and the PPR, and the use of the Missile Assembly Building, do not substantially change the affected environment with the exception of the Western snowy plover.

3.1 Western snowy plover

The western snowy plover (Charadrius alexandrinus nivosus) is a small (6-7") pale plover inhabiting beaches, dry mud or salt flats, and sandy shores. It occurs in North America along the Pacific coast from southern Washington to southern Baja California. Figure 3-1 depicts this bird, along with the previously described least tern.

Snowy plovers have declined as a nesting species throughout southern California and the project region due in part to human disturbance of their sandy beach nesting habitat. It has been extirpated as a breeder from beaches in southern Santa Barbara county, but continues to breed and winter along undisturbed sandy beaches on Vandenberg AFB, from 576E northward to north of Minuteman Beach as well as from the sandy area north of Wall Beach southward to 3 1/2 miles south of the Santa Ynez River. They also occur from the base's southern boundary northward about 1 1/2 miles. The breeding season is considered to be from mid-March to mid-September. Population counts show year-round occupancy at VAFB. In 1992, the population in the Purisma Point area ranged from 1 individual in January to a peak of 64 in July. It also occurs on base on the beaches north of that point up to Minuteman Beach, and at the mouth of the Santa Ynez River to the south (Reference 7).

The Western snowy plover has been a Category 2 candidate for a number of years, and is now federally designated a Threatened species as of 5 April 1993 (Reference 8).

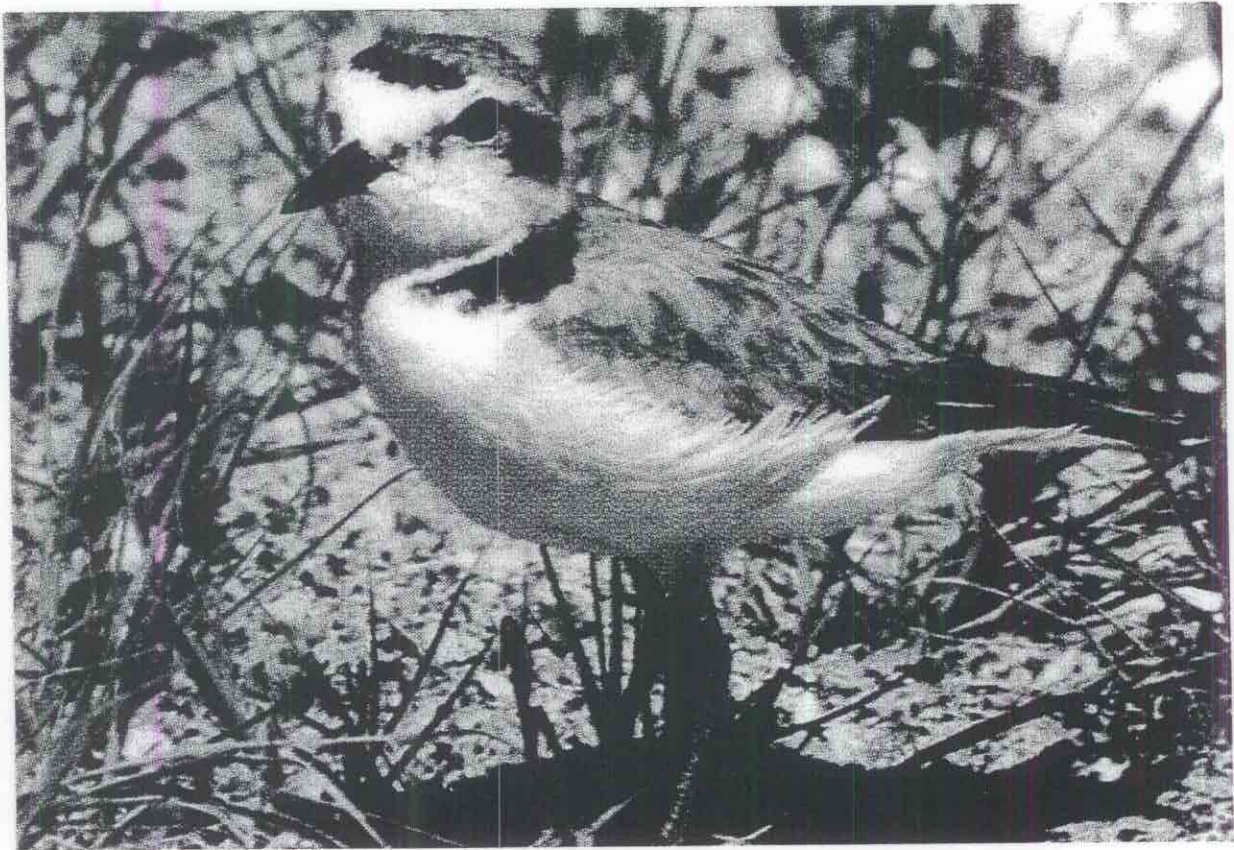
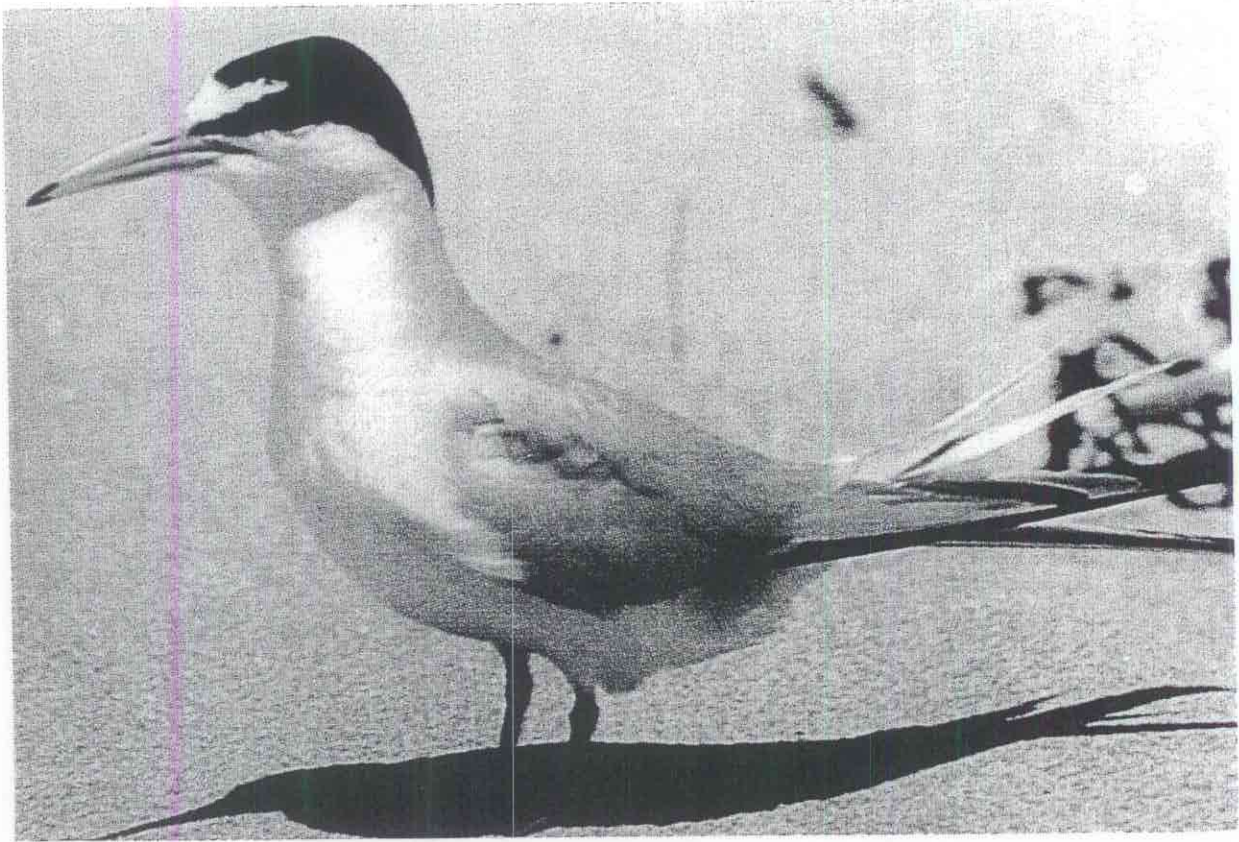


Figure 3-1 California least tern and western snowy plover

4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION

4.1 Missile Assembly Building Usage

The MAB usage has been addressed and approved by VAFB Environmental Management (30SPW/ET) through an Air Force Form 813 "Request for Environmental Impact Analysis". This form is incorporated herein by reference, and is included as Appendix A of this document.

4.2 Launch during least tern and snowy plover nesting season

A review of the Taurus launch program and its noise impacts have been completed by the USFWS, with special attention to the potential for adverse effects to the welfare and reproductive success of the California least tern (Sterna antillarum brownii). See Appendix B for correspondence on this and other consultations. This endangered specie nests in dune areas in the vicinity of the 576E launch site. The actual effects on least tern nesting behavior, hearing acuity or other effects is not precisely known. However it is suspected that the loud noise imposed by the Taurus launch could cause a startle response, leading to nest abandonment and egg/chick mortality. Hearing threshold shifts could also occur, with unknown long and short term effects on reproductive success or feeding success.

Another concern arising from launch is the expulsion of hydrochloric acid (HCl) and aluminum oxide (Al₂O₃) from the first stage motor as stated in the original EA, Table 4.2-4. Although Taurus has a very high acceleration rate, reducing the amount of deposits released in the lower atmosphere (for example, compared to Titan IV), there will be some deposition on the ground as a function of wind speed and direction. There is some potential for this material to be deposited directly or indirectly on birds, eggs, food supply etc. Although recent deposition tests on Peacekeeper and Delta launches confirm minor amounts of deposits, quantification of the deposits is difficult.

The western snowy plover (Charadrius alexandrinus nivosus) has recently been federally listed as a Threatened species, and therefore must be similarly protected. This bird inhabits a much larger area of the base, but in the 576E area, it inhabits substantially the same habitat as the least tern. The same concerns regarding noise and air pollution apply. Its nesting season extends from mid-March to mid-September though it is a year-round resident.

In addition to the least tern and the snowy plover, a group of Southern sea otter (Enhydra lutris nerensis) has been rafting in a kelp bed directly west of 576E, and the effects of launch noise on this threatened species is unknown.

For these reasons, USFWS has granted permission to launch once during the least tern and snowy plover nesting season conditional on the performance of certain mitigation requirements to minimize the potential for such adverse impacts and improve understanding of

launch effects. In response to another USFWS recommendation, monitoring of the Southern sea otter will be performed by qualified wildlife biologists before and after the first launch. This colony is usually rafting in kelp beds about 3800 feet west of 576E. A qualified wildlife biologist will observe the subject otter colony, performing a census of adult and juvenile individuals. This is to be performed no more than 24 hours before the launch and again no more than 24 hours after the launch, noting any observable changes in population and behavior.

The following are the required mitigation steps:

- 4.2.1 Launch Noise Monitoring will be performed for the first Taurus launch (whether in the nesting season or not) to validate or correct the estimated noise level. Such monitoring is to be conducted at approximately 1000, 2000, 3000 and 4000 feet from the launch site, and recorded over a 1 Hz to 16 KHz range for spectral analysis as well as SEL and OASPL computation.
- 4.2.2 Wind direction at launch will be restricted to minimize the potential for deposition of HCl and Al₂O₃ in the nesting area. Specifically, the Taurus will not be launched when the launch site winds are in the direction of the Purisma Point colony. This occurs with winds from 90 to 150 degrees true (Ref. 5).
- 4.2.3 Taurus will participate in least tern habitat enhancement projects.
 - 4.2.3.1 125 least tern decoys and a number of habitat shelters (roof tiles) will be placed in Purisma Point habitat areas before the nesting season, for the purpose of attracting breeding terns to the site.
 - 4.2.3.2 A U.S. Department of Agriculture (USDA) Animal Damage Control study will be conducted on the extent of predation, the effectiveness of non-lethal protection measures and recommended predator control techniques at the Purisma Point colony. This study could be extended to the mouth of San Antonio Creek if nesting is attempted there.
 - 4.2.3.3 A wooden pole in the habitat area used by avian predators will be removed.
 - 4.2.3.4 USAF will support a USFWS study into the impacts of noise on avian species, and the least tern/snowy plover monitoring program will be increased in frequency.
 - 4.2.3.5 Fencing will be erected around the Purisma Point nesting area prior to the 1993 least tern nesting season.

4.2.3.6 A western snowy plover monitoring program will be prepared and carried out.

4.2.4 Informal consultation with NMFS has resulted in a requirement for monitoring pinnipeds at Purisma Point and Rocky Point during launch. In accordance with the NMFS letter (see Appendix B), noise levels and behavioral responses at these haulout areas will be monitored by a qualified wildlife biologist.

After the first Taurus launch, the results of this mitigation and monitoring will be reviewed with USFWS and NMFS representatives.

4.3 Change in Routing of Fiber Optics Cable

Routing options 1 and 2 herein have been reviewed for impacts to the area biota, cultural resources or other environmental elements. It is planned that the cable will be laid and recovered using a pickup truck equipped with reels of approximately 1 1/2 mile capacity, operating on the pavement of Spur Road, Tangair Road, Cross Road and 13th Street in the normal direction of travel (along the right side). When laying cable along the dirt roads involved, the same vehicle will operate on the presently graded and compacted surface, laying the cable along the shoulder of the road by use of a boom device or manual guidance. Sandbags will be placed on the cable periodically to hold it in place. The cable will not be laid across paved roadway, except Spur Road. Hence normal base traffic will not be impeded once the cable is in place, and only minimally impeded when emplacing and recovering the cable.

This approach will not require the disturbance of flora along the route except for (1) possible trimming of plants overgrowing the road shoulder and (2) clearing of a small area along the north shoulder of Spur Road about 375 feet from the launch stand. This area is to be cleared of vegetation, filled and compacted without scarification into a "pad" or "pullout" approximately 14 ft. wide and 26 ft. long to support the Launch Equipment Van (LEV) (see Figures 2-1 and 2-2). The exact location will also be chosen so as to minimize impacting native plant species; much of that area is now overgrown with non-native iceplant.

With regard to cultural resources, Spur Road itself outside of the launch complex is not considered part of the potential historic structure under review. An archaeological survey has been conducted in the area and is reported in the baseline EA (Reference 1). The creation of the above described "pullout" for the LEV does not endanger any of the identified sites. However, both cable routing options could pose a risk to Site ES-576E-4. For that reason, a base archaeologist will observe the emplacement and recovery of the fiber optics cable.

The type of fiber optics cable to be used is heavily armored to protect against vehicle damage as well as preclude gnawing damage from local animals.

4.4 Launch Stand Redesign

In view of the changes to the launch stand design involving raising the height of the stand as described in paragraph 2.4, impacts to the IRP status, soils and geology or to cultural resources are considered not significant. It should be noted that recent soil borings in the pad area have been performed to a 5 foot depth, and have found no significant contamination.

4.5 Change in Payload Processing Facility

It is currently planned that payload processing, including hydrazine loading, will be performed in the SLC-6 Payload Processing Room airlock. The activities performed in this facility, as well as the equipment used for hydrazine loading, are described below. The route from the PPR to 576E will use a route approved by 30 SPW Safety. Based on the analysis of the facility and the planned provisions for hydrazine loading, as described in paragraph 2.5, it is found that there are no significant impacts on either Health and Safety or Air Quality.

An alternate facility has been selected for the prelaunch processing and integration of the payloads due to potential conflicts with other users of Building 1610, which was covered in the baseline EA. This facility is Building 1559, a facility currently assigned to the DMSP program. Either of the three buildings may be used depending on the changing launch schedules for both Taurus and such programs as NOAA and DMSP.

Building 1559 is located in the central VAFB area on Tonto Road. Figure 2-6 presents a floor plan of the facility. It was designed and built for the processing of DoD satellites, including satellite integration, testing and loading of hypergolic propellants. No modifications to the facility are required to accommodate the Taurus payload operations. All STEP Mission 0 and DARPASAT activities are expected to occur in the northernmost building of the facility, with STEP Mission 0 assembly, test and loading occurring in the High Bay in the northeast corner of that building. This area is a Class 100,000 clean room complying with FED-STD-209.

Fire protection in this area is provided by a halon 1301 fire suppression system. Halon 1301 is a listed Ozone Depleting Chemical (ODC) which is to be phased out of USAF and worldwide use because of the damage it causes to the stratospheric ozone layer. These materials are controlled under the Action Memorandum (Reference 6) from Gen M. McPeak and USAF Secretary Rice, effective 1 January 1993. Under this policy, halon flooding systems shall have their automatic discharge mechanisms disabled and systems placed on manual activation to reduce accidental halon loss to the atmosphere. Also, they are to be replaced with non-halon alternatives through attrition as facilities are renovated, modified or removed from service.

The work to be performed in either this facility or the Payload Processing Room is essentially the same as covered in the baseline EA for Building 1610. This consists of mechanical work (handling and assembling spacecraft hardware and GSE), electrical work (mating of interfaces and functional testing), hypergolic propellant loading of the STEP Mission 0 satellite, and ordnance installation and testing (MSA and fairing deployment devices).

Hypergolic propellant loading consists of transferring 170 pounds of propellant grade hydrazine from a 55-gallon drum into STEP Mission 0 tankage using a propellant and pressurization unit. Currently, it is planned that a unit designated as a NOVA Propellant and Pressurant Service Unit (PPSU), Part No. 2272365 will be used. This unit is operated by General Electric and stored in building 1559, but is operated in both Buildings 1559 and 1610 on different satellite programs. Its use on DMSP in Building 1559 and NOAA in Building 1610 is covered by a De Minimis Exemption issued by the Santa Barbara County Air Pollution Control District (SBCAPCD). This exemption covers Taurus/STEP Mission 0 loading operations in either building.

NOTE: It should be noted that the availability of this loading equipment is in question. However, any substitute equipment will be evaluated under both systems safety and air quality guidelines, and proper SBCAPCD permit coverage obtained.

The building 1559 High Bay is equipped with provisions to control and contain any unexpected leaks or spills of the flammable and toxic hydrazine fuels. A fully lined and sealed retainment trench surrounds the loading area, with the sealed floor surface sloped to drain into it. Capability for water washdown is provided to reduce the hydrazine content below a flammable concentration. The fuel/water mixture in the trench will be analyzed, treated and pumped from the trench by the base hazardous materials disposal contractor for disposal under approved base procedures. Electrical wall outlets in the high bay are explosion proofed, although fixtures at higher levels are not. This is because hydrazine vapors from a spill tend to remain near floor level.

The heating, ventilating and air conditioning (HVAC) system normally operates in a recirculating mode to maintain clean room conditions, drawing in only a small amount of makeup air from outside to maintain positive pressure. During hydrazine loading, the loading crew will be in Self-Contained Atmospheric Protective Ensembles (SCAPE) and the HVAC system will be switched to draw in 100% outside air, which is exhausted to the outside through large vents in the lower rear area of the high bay. In the event of a spill, this would result in a toxic vapor release but in this case, safety considerations for building occupants override toxic air pollutant considerations. Acute toxic effects on personnel outside the building are precluded by enforcing a clear area around the building during loading operations. The capability also exists in the event of a spill to kill the HVAC system, trapping vapors in the high bay and permitting cleanup by SCAPE-suited personnel before reactivating the 100% air mode and exhausting to the outside.

Regardless of what facility is used for payload integration and processing, it is planned that a loading rehearsal will be conducted under safety requirements, using a mockup of the actual satellite along with the actual building and loading equipment. This will, however, involve no handling of hydrazine fuel or other hazardous materials.

The loaded STEP Mission 0 spacecraft will be integrated with the DARPASAT spacecraft and the Taurus fairing into what is called the Multiple Spacecraft Assembly (MSA). This assembly will be transported by flatbed trailer truck to Facility 576E where it will be lifted by crane to the Taurus interface and bolted into place. The planned transportation route will be down Tonto Road to 35th St., to New Mexico St., to Tangair Road westbound, then alongside the airfield to Spur Road and along Spur Road to the pad. This is a distance of about 5.5 to 5.7 miles. As with the route from Building 1610, it crosses the AMTRAK railroad tracks. Therefore, the requirement in Reference 1 that this transportation be scheduled around AMTRAK's schedule also applies here. Potential leakage of hydrazine during transportation and on the pad will be controlled by use of emergency offloading equipment and procedures.

A Hazardous Waste Management Plan is in place for Building 1559 operations under the General Electric Vandenberg Operations Hazardous Waste Management Plan.

In summary, the usage of either Building 1559 or the SLC-6 PPR introduces no significant environmental impacts to the Taurus T1 mission. However, the following provisions should be followed:

- a. For 1559, the halon fire suppression system must be disabled from the automatic discharge mode in compliance with the recent HQ USAF Action Memorandum on ODC elimination.
- b. The hydrazine loading equipment must be properly covered by air quality permitting. For the existing GE unit, there exists a DeMinimus exemption for a hydrazine loading cart at Buildings 1559 and 1610. This exemption also covers Taurus/STEP 0 operations with that equipment. However, if a unit new to VAFB is selected, a permitting process may be involved.
- c. For any of the three payload facilities, Range Scheduling of the transporting of the MSA from the payload processing facility to 576E will include a check to assure no AMTRAK trains are scheduled when the move is made.

5.0 PERSONS AND AGENCIES CONSULTED

The following individuals and agencies were consulted during the preparation of this Supplemental Environmental Assessment:

Chizmadia, Lisa	Orbital Sciences Corporation, Chantilly, Virginia
Cugini, Tom	730th Civil Engineering Squadron, Vandenberg AFB
Dawes, Dr. Linda	U.S. Fish & Wildlife Service, Carlsbad CA
Duncan, LtCol Miguel	USAF, 6595 TEG/DTP, Vandenberg AFB
Edwards, Capt Cecilia	USAF, 6595 ATG/TSP, Vandenberg AFB
Engen, Capt David	USAF, 6595 TEG/DTR, Vandenberg AFB
Eliseo, John	USAF, 30 SPW/SE, Vandenberg AFB, CA
Inguaggiato, Capt Mark	USAF, 6595 TEG/ENF, Vandenberg AFB
Martin, Capt Randy	USAF, 6595 TEG/ENF, Vandenberg AFB
Mudgett, Lt Leslie	USAF, 6595 TEG/ENF, Vandenberg AFB
Morgan, Dan	Orbital Sciences Corp., Chandler AZ
Porter, Russell	GE Astrospace, Vandenberg AFB, CA
Shell, Capt Dale	USAF, 6595 TEG/DTP, Vandenberg AFB
Stevens, Thomas	USAF, 6595 TEG/DTP, Vandenberg AFB
Wheatley, Maj Alan	USA, ARPA Program Manager for Taurus
Wiskowski, Tara	USAF, 30 SPW/ET, Vandenberg AFB Environmental Management

6.0 REFERENCES

1. USAF, 1992. Environmental Assessment, Taurus Standard Small Launch Vehicle Program, Vandenberg AFB, CA, April.
2. USAF, 1987. Environmental Assessment, Peacekeeper In Rail Garrison and Small ICBM Flight Test Program, Vandenberg AFB, CA, November.
3. USAF, undated. Draft Environmental Impact Statement, MX: Milestone II, Volume III Missile Flight Testing, Vandenberg AFB, CA.
4. USAF, 1975. Final Environmental Impact Statement, United States Air Force Space Launch Vehicles. Department of the Air Force Space and Missile Systems Organization, Air Force Systems Command (Referenced in 1988 EA on MLV Program at CCAFS).
5. Telephone conversation with Mr. Mike McElligot, VAFB Base Biologist, 5 January 1993.
6. USAF, 1993, Action memorandum: Air Force Ban on Purchases of Ozone Depleting Chemicals. HQ USAF, January.
7. Western Snowy Plover Survey, transmitted by Mr. Al Naydol, Chief of VAFB Natural Resources, 19 March 1993.
8. Federal Register, Volume 58, Number 42, Page 12864 & subs., 5 March 1993.

7.0 LIST OF PREPARERS

Keegan, Norman R. The Aerospace Corporation, Advanced Plans Directorate.

Professional Disciplines:
Aerospace Engineering - 36 yrs.
Environmental Management - 2 yrs.

Mizera, Dr. Paul The Aerospace Corporation, Advanced Plans Directorate

Professional Disciplines:
Aerospace Engineering - 22 yrs.
Environmental Management - 3 yrs.

APPENDIX A

CATEGORICAL EXCLUSION FOR
USE OF MISSILE ASSEMBLY BUILDING
FOR TAURUS PROGRAM

REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

FOR ENVIRONMENTAL
PLANNING USE
ONLY

REQUEST

1. TO: (Environmental Planning Function)

30 SPW/ET

2. FROM: (Organization and Office Symbol)

DARPA

3. CONTROL NUMBER

92-715

5. REQUESTOR (Name, Office Symbol and Phone No.)

LT COL DUNCAN III, 6595 TEG/DTP, 6-3353

4. ESTIMATED COMP DATE

6. TYPE OF ANALYSIS NEEDED

CATEX

DETERMINATION

PRELIMINARY

ENVIRONMENTAL SURVEY

ENVIRONMENTAL

ASSESSMENT

ENVIRONMENTAL

IMPACT STATEMENT

7. TITLE OF PROPOSED ACTION

TAURUS STAGE PROCESSING IN MISSILE ASSEMBLY BUILDING (MAB)

PROPOSED ACTION AND ALTERNATIVES

8. PURPOSE OF AND NEED FOR ACTION (Continued on 1 Sheets)

DARPA has decided to reduce costs and schedule conflicts by possibly utilizing a nearby facility as an alternate site to process stages for launch. This activity requires a facility with a high bay, overhead cranes, and a safety clearance for ordinance. The Missile Assembly Building (MAB; Bldg 1819) is the most appropriate facility available.

9. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES (DOPAA) (Continued on 1 Sheets)

SEE ATTACHED SHEET

10. ORGANIZATIONAL APPROVAL (Name and Grade of Commander)

ALVIS A. WHEATLEY, MAJOR

SIGNATURE

Alvis A. Wheatley

DATE

22 Sep 92

ENVIRONMENTAL PLANNING RESPONSE

11. RESPONSES ATTACHED

☐ Preliminary Environmental survey (AF Form 814) attached

☒ Proposed action qualified for Catex (Appropriate Documentation attached)

☐ Proposed action does not qualify for Catex, assessment required

12. REMARKS

The proposed action qualifies as a categorical exclusion under AFR 19-2, Atch 7, para 2r; continuation of actions, provided there is not substantial, adverse change from previously existing conditions, and para 2a; those with an insignificant effect as established in a previously written environmental assessment and a finding of no significant impact.

13. ENVIRONMENTAL PLANNER CERTIFICATION (Name and Grade)

TARA WISKOWSKI
Environmental Protection Specialist

SIGNATURE

Tara Wiskowski

DATE

15 Oct 92

14. ENVIRONMENTAL PROTECTION COMMITTEE APPROVAL (Name and Grade)

LOUIS D. VAN MULLEM, Lt Col, USAF
Chief, Environmental Management

SIGNATURE

Louis D. Van Mullem

DATE

16 Oct 92

9. Description of Proposed Action and Alternatives (DOPAA)

Stage Processing: To reduce mobile convoy requirements, schedule delays, and costs, DARPA wants to use the MAB as an alternate site to process the Taurus missile stages. The Air Force designed and utilized the MAB to process Peacekeeper (Ref 2.0), Small ICBM, and Peacekeeper Rail Garrison missile stages [as analyzed and approved in Reference 1.0 (Sections 2.1 and 2.3)]. Taurus stage processing procedures are similar to procedures previously utilized in the MAB. Taurus processing has less potential impacts than the aforementioned programs. No MAB facility modifications for Taurus stage processing will be required. No Taurus processing activity will take place outside the MAB.

In previous assessments of environmental impacts as a result of stage processing in the MAB, only two areas had potential impacts: propellants and personnel. These two areas were found to be of no impact. Consequently, since Taurus is a smaller vehicle than those previously processed in this facility, this reduces the potential of adverse environmental effects.

AREAS OF REDUCED IMPACTS

Propellants: The Peacekeeper has a total of 170,000 pounds of 1.3 (stages 1 & 2), 1.1 (stage 3) propellants, and 1400 pounds of hydrazine fuel (stage 4). The Small ICBM has a total of 33,320 pounds of 1.1 (all stages) propellant. During periods of joint processing, these combine for a total of about 203,320 pounds of 1.1 and 1.3 propellants.

Conversely, the Taurus is only composed of about 140,000 pounds of the more stable 1.3 propellant. Also, Taurus contains no hydrazine fuel.

Personnel: The Peacekeeper and Small ICBM joint processing efforts required 178 people (Ref 1.0; sections 2.1.3 and 2.3.3).

Taurus stage processing and required Test Range safety equipment installation will require 30 people and will conform to all existing safety and environmental constraints for the MAB. Additionally, this lower number of personnel cuts down on traffic, noise, utilities, wastewater, safety concerns, water use, and air pollution (automobile exhaust).

- Ref 1.0 Environmental Assessment and Finding of No Significant Impact: Peacekeeper in Rail Garrison and Small ICBM Flight Test Program, November 1987.
- Ref 2.0 Environmental Impact Statement, MX Milestone II FEIS, March 1979.
- Ref 3.0 Voluntary Biological Assessment, Peacekeeper in Rail Garrison and Small ICBM Flight Test Program, 27 October 1987.

APPENDIX B

TAURUS PROGRAM CONSULTATIONS

U.S. FISH AND WILDLIFE SERVICE
CALIFORNIA COASTAL COMMISSION
NATIONAL MARINE FISHERIES SERVICE
CALIFORNIA OFFICE OF HISTORIC PRESERVATION



United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
SOUTHERN CALIFORNIA FIELD STATION
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

July 10, 1992

Mr. James L. Johnston GS13
30th Space Wing / Environmental Management
Vandenberg Air Force Base, CA. 93437

Re: Environmental monitoring, and mitigation for, project-related impacts of
Peacekeeper launches to Purisima Point California Least Tern Colony

Dr. Mr. Johnston:

The intention of this correspondence is to summarize the meeting of June 22, 1992. The specific focus of this meeting was the impact of Peacekeeper launches at pad 576E to the California Least Tern (Sterna Antillarum browni) colony at Purisima Point, and measures which could be taken to offset these impacts. Additionally, after a visit to the site, it became obvious that other operations could potentially have a deleterious impact on this colony and they are also discussed below. The two principle issues were monitoring of exhaust plume deposition, and monitoring of noise.

The U.S. Fish and Wildlife Service (Service) has the legal responsibility for the welfare of migrating birds, anadromous fishes and endangered animals and plants occurring in the United States. The Service has responsibilities under the Endangered Species Act of 1973, as amended (Act). Section 9 of the Act prohibits the "take", defined as harm, harassment, pursue, injure, or kill, of federally listed species. "harm" is further defined to include destruction of necessary habitat or disruption of essential breeding, or feeding behavior. The California least tern is a federally listed endangered species, and thus has full protection under the Act.

The implementing regulations of the National Environmental Policy Act (NEPA), as amended (42 U.S.C. 4321, et seq.) directs the Service to consider direct, indirect, and cumulative effects in its determination that discretionary actions of an agency may effect a protected species or resource. "Cumulative" impacts are defined as "individually minor, but collectively significant actions taking place over a period of time", Part 1508.7. These launches, and other base activities, may individually, or collectively, harm the California least tern.

With respect to exhaust plume deposition, it is agreed that the Service will measure Hydrochloric acid and Aluminum Oxide levels to determine the extent of possible impacts to the tern. Additionally, the Air Forces' own data, obtained from Bioenvironmental Engineering, indicate that the footprint of the

Mr. James L. Johnston GS13

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exhaust plume is strongly dependent on wind direction and speed. Therefore, the Service strongly recommends that wind direction be added to the list of launch criteria. If the wind is blowing from the launch site toward the colony, the launch would be delayed.

With respect to the short and long term effects of noise on wildlife, inadequate information is available. Therefore, the Service is presently unable to establish an absolute threshold of significant disturbance. It is unlikely, however, that any species as dependent acoustically as the tern would be unaffected by the launches at Vandenberg AFB. A report on the Minuteman launches at Vandenberg (1) indicated that one of eight incubating adults left its nest and 14 "loafing" birds exhibited a startle response during the launch. The local long term effects of noise are entirely unknown, but are presumed not to be therapeutic. To rectify this situation, the Air Force, or its customers, have agreed to record sound emitted during launches in a manner permitting subsequent analysis appropriate for wildlife. Noise measurements weighted for human perception (dbA) are clearly inadequate for assessments of avian responses to noise. After consultation with Dr. Mel Kreithen of the University of Pittsburgh, Dr. Darlene Ketten of Harvard, Dr. Bill Langbauer of Cornell, Dr. Barbara Bohne of Washington University in St. Louis, and others, the Service has learned that birds as a group respond to frequencies as low as .01 Hertz as measured by heart-rate telemetry in the laboratory. As the sound emitted from the Peacekeeper would be enriched in lower frequencies, the Service considers it important to resolve questions concerning the impact of intense, intermittent, low frequency noise to wildlife.

To address this issue, agreement was reached that The Aerospace Corporation would record sound during the Peacekeeper launch over a frequency range of 1 to approximately 16,000 Hertz at distances of 1000, 2000, 3000, and 4000 meters directly under the path of the rocket, which would represent a worst case scenario. This protocol will be followed for each type of rocket.

The value of this approach, in which sound is recorded, and not measured, is that a permanent record is acquired which will be taken for spectral analysis. Experts can analyse the behavioral and physiological effects of noise on animal models in the laboratory, segment by segment. Dr. Mel Kreithen has agreed to participate in this research, provided it is done in a scientifically rigorous fashion. The Service recommends that the Air Force, or its customers, fund such research.

Due to rapidly developing events, time did not allow use of optimum microphones, and other equipment. The Service has learned from Mr. Bill Chollman, field applications engineer for Bruel and Kjaer, that microphone #4147 responds to frequencies between .4 and 18,000 Hertz, and hydrophone #8104 responds between .1 and 80,000 Hertz. Dr. Mel Kreithen, indicates that the vent hole in microphones used to record in high humidity environments such as the tropics may be plugged to enable them to respond to frequencies as low as .1 Hertz. Efforts will continue to optimize equipment.

Mr. James L. Johnston GS13

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In addition to monitoring exhaust plume deposition and noise, the Service recommends that all other impacts be avoided or minimized. During a second meeting on the 23rd, it was agreed that helicopters not fly within a 2000 ft radius of the tern colony, that the area of the tern colony be excluded as an area for emergency dumping of fuel, and that all fixed wing aircraft bank and maintain flight patterns during touch and go exercises, so as to reduce noise levels within the tern colonies. Sound recordings should also be taken of helicopters and of a representative fixed wing aircraft at an appropriate distance, if this data is not already available. The Service also recommends that during the first launch adjacent to the terns that both the terns and the Southern sea otter (Enhydra lutris nereis) be visually monitored. An additional recommendation of the Service is that prior to the arrival of the terns in the spring, decoys be placed at a suitable site which will offer the greatest protection from project-related impacts. This action will also provide information on the effectiveness of these decoys in attracting terns to a given site.

Finally, the tern colony would benefit from a predator management program accompanied by an adequate monitoring program done by experienced personnel. The Service recognizes that predator control is a sensitive issue from both an ecological and public relations standpoint. Because of the military presence, this area has been maintained as a relatively intact ecosystem. Therefore, before any predator control is initiated a careful environmental assessment to determine the effects on the tern colony and adjacent area is needed. While Atwood (2) attributed predation to the coyote (Canis latrans) on the basis of observed tracks and sightings of coyotes on site on several occasions, predation was not actually observed. Also, the major predator may vary from year to year. In any event, the exact nature of the predation responsible in part for the poor reproductive success of these tern colonies needs to be established unequivocally. This can best be done in conjunction with a monitoring program. When nest predation is observed by a monitor, Animal Damage Control can be called in to determine the predator responsible for the loss. An acceptable monitoring program consists of observations made three times per week by an experienced person, using a spotting scope or patrolling the colony in a mobile blind. Given the funding, the Service is willing to supply experienced personnel to accomplish these tasks.

Inquiries should also be made of other agencies responsible for tern management to see what strategies have worked for them. A combination of drift fences to direct the blowing sand, and barrier fences, with adequate maintenance may be sufficient to limit predation. If predator removal is necessary, it is hoped that with a few years of protection, the colony will rebound to the point where the number of eggs and chicks taken by coyotes and other predators would be insignificant.

Although a potentially divisive strategy, predator control is underway across the country to protect such species as Kirtlands warbler (Dendroica kirtlandii), Sandhill crane (Grus canadensis), and Least Bells vireo (Vireo bellii pusillus). Improvements in the reproductive success of these and other species has been noted upon implementation of predator control. The Endangered Species Act does prioritize the needs of endangered species such as

Mr. James L. Johnston GS13

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the tern, over other species such as skunks, ground squirrels, racoons, and coyotes.

Although the Purisima Point tern population represents a small proportion of the current population, the site contains high quality habitat which is secure from human intrusion. Consequently, protection of the California least tern colonies on Vandenberg AFB represents a significant step in the preservation of this species.

The Service appreciates the cooperative and progressive attitude adopted by Air Force personnel at the June 22nd meeting. As has occurred at other military installations, we fully expect that a balance can be achieved between the needs of sensitive and declining species on one hand, and the operational needs of the base, on the other.

If you have any questions please contact Dr. Linda Dawes, of my staff, at (619)431-9440.

Sincerely,



Richard Zembal,
Deputy Field Director

LITERATURE CITED

1. Henningson, Durham, and Richardson. (1981). Effects of Minuteman launch on California least tern nesting activity, Vandenberg AFB, CA. United States Air Force, Ballistic Missile Office, Norton AFB, CA.
2. Atwood, J.L. (1984). Least tern breeding biology at Vandenberg AFB. Contract DACA09-83-M-0094(P002). Department of the Army, Los Angeles District, COE.

ETN 21C-2
Taurus



United States Department of the Interior

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
Southern California Field Station
2730 Loker Avenue West
Carlsbad, California 92008

July 22, 1992

Mr. James L. Johnston GS13
230th Space Wing/Environmental Management
Vandenberg Air Force Base, CA. 93437

Re: Environmental Impact Analysis Process: Taurus Environmental Assessment

Dear Mr. Johnston:

The U.S. Fish and Wildlife Service (Service) has reviewed the referenced document which proposes no more than three launches of the taurus vehicle at site 576E per year. Our recommendations are based on our knowledge of the sensitive species and habitats on Vandenberg AFB, as well as the onsite visit and meetings held on June 22 and 23, 1992. The major species of concern are the California least tern (Sterna antillarum brownii), a federally listed endangered species, and the Southern sea otter (Enhydra lutris nereis), a federally listed threatened species. To offset the impacts of the Taurus launches to these species, the following measures will be taken:

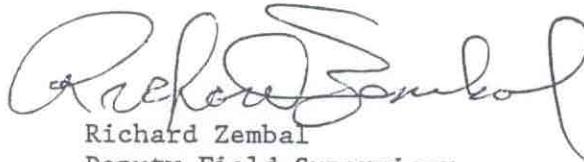
- 1) No launch will be scheduled during the California least tern nesting season. A single launch will occur during this time only if unavoidable delays occur.
- 2) Noise from the launch will be recorded over a frequency range of 1 to 16,000 Hertz at a distance of 1000, 2000, 3000, and 4000 meters. Research to assess the impact of these recordings will be funded.
- 3) Exhaust plume deposition of hydrochloric acid and aluminum oxide will be made by Service personnel and funded by the Air Force, or its customers.
- 4) Wind direction will be added to the list of launch criteria; no launch will occur if the wind is blowing toward the tern colony.
- 5) Helicopters will not fly within a 2000 ft radius of the tern colony. Fixed wing aircraft will bank so as to reduce noise levels during touch and go exercises.
- 6) The area of the tern colony will be excluded as an area for emergency dumping of fuel.
- 7) The southern sea otter will be monitored by experienced personnel, such as the base wildlife biologist, before and after the launch.

- 8) A formal least tern management program will be written. This program will include monitoring 3 times per week as well as other interventions deemed necessary by an environmental assessment. This will probably involve judicious predator control. Other strategies may include newer types of fencing. In any event, the findings of the environmental assessment will be implemented to secure the future of the California least tern on Vandenberg AFB. Also, prior to the arrival of the terns in the spring, a maximum of 100 decoys should be placed at a suitable site which will lessen project-related impacts to the tern.

With this mitigation in place, a single launch in the tern nesting season is acceptable.

If you have any questions, please contact Dr. Linda Dawes, of my staff, at (619)431-9440.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Richard Zembal', written in a cursive style.

Richard Zembal
Deputy Field Supervisor



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 30TH SPACE WING (AFSPACECOM)
VANDENBERG AIR FORCE BASE, CALIFORNIA 93437-5000

8 1 AUG 1992

Dr Linda Dawes
US Fish and Wildlife Service
Southern California Field Station
2730 Loker Avenue West
Carlsbad CA 92008

Dear Dr Dawes

This letter is in response to your letters dated July 10, 1992 and July 22, 1992, and subsequent discussions and field visits concerning the informal consultations on the Taurus and Delta II programs. The US Air Force agrees to accomplish the following actions to mitigate any potential impacts to the California Least Tern and Southern Sea Otter populations at Vandenberg AFB:

a. Launch noise and exhaust plume deposition will be monitored for the spring 1993 Taurus launch and the fall 1993 Delta II launch. Monitoring data will be analyzed after each launch by the US Fish and Wildlife Service to determine potential impacts to endangered species, and a report of findings will be prepared and provided to the Vandenberg Environmental Management Office.

b. Launches will not occur during the California Least Tern nesting period when the wind is blowing toward the Purisima Point Colony.

c. The Air Force agrees to provide funds to the US Fish and Wildlife Service in the amount of \$5,000 to fund scientific research on the impacts of noise to avian species.

d. Aircraft will avoid flight within a 1,900 foot radius of any California Least Tern Colony during the nesting period.

e. The Air Force agrees to place the emergency aircraft fuel jettison point a minimum of two nautical miles offshore.

f. The Southern Sea Otter population will be monitored by the base wildlife biologist before and after the above mentioned launches.

g. The Air Force will purchase 50 roof tiles to be used as shelters prior to the 1993 California Least Tern nesting season.

h. The Air Force will provide funds to the US Fish and Wildlife Service in the amount of \$1,800 to purchase 125 California Least Tern decoys for placement at Vandenberg AFB.

i. The Air Force will provide funds to the USDA Animal Damage Control in the amount of \$20,000 to provide monitoring and a report on the extent of predation, test and evaluate the effectiveness of non-lethal protection measures and recommend predator control techniques at the Purisima Point Colony and if nesting is attempted at the mouth of San Antonio Creek.

j. The Air Force agrees to increase the existing monitoring program to three days a week.


k. The Air Force agrees to remove to ground level the tall wooden pole that is near the Purisima Point Colony being used as a perch by avian predators.

l. The Air Force agrees to enter into a Memorandum of Agreement with the US Fish and Wildlife Service to protect and enhance California Least Tern habitat and populations at Vandenberg AFB. This agreement will result in a formal California Least Tern management program as information is gathered.

We understand that the enhancement of an endangered species population takes time and we look forward to working with the service in this endeavor.

It is our understanding that the above mitigation requirements fulfill our obligation under the Endangered Species Act for Taurus and Delta II launches at Site 576E and SLC-2 for any potential effects to endangered species. We have enjoyed the cooperative efforts of the Service in this matter.

Sincerely

A handwritten signature in dark ink, appearing to read "Louis D. Van Mullem", written in a cursive style.

LOUIS D. VAN MULLEM, Lt Col, USAF
Deputy Chief, Environmental Management



United States Department of the Interior

TAKE
PRIDE IN
AMERICA

FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

Ventura Field Office
2140 Eastman Avenue, Suite 100
Ventura, California 93003

April 12, 1993

Mr. Mackey J. Real, Jr., Chief
30th Space Wing/Environmental Management
Department of the Air Force
Vandenberg Air Force Base, California 93437

Subject: Biological Opinion for Missile Launches From Two Sites at
Vandenberg Air Force Base, Santa Barbara County, California
(1-8-93-F-8)

Dear Mr. Real:

This biological opinion responds to your request for formal consultation with the Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (Act). Your initial request, which pertained only to the Space Launch Complex-2 West (SLC-2W) site, was dated January 7, 1993, and received by us on January 11, 1993. Your second request, which included operation of the 576E site, was dated February 23, 1993, and received by us on February 24, 1993. At issue are the impacts that operation of SLC-2W and 576E during the nesting season may have on the California least tern (*Sterna antillarum browni*), a federally listed endangered species and the western snowy plover (*Charadrius alexandrinus nivosus*), a federally listed threatened species. This biological opinion will not address the brown pelican (*Pelicanus occidentalis*) or southern sea otter (*Enhydra lutris nereis*). The Service and the U.S. Air Force have agreed, through informal consultation, that operation of SLC-2W and 576E would not affect these species.

This biological opinion was prepared using information: included with the requests for consultation; contained in the environmental assessment for Modification of SLC-2W Medium Expendable Launch Vehicle Services (SLC-2W EA) (National Aeronautics and Space Administration [NASA] 1991) and its subsequent supplemental environmental assessment (SLC-2W SEA) (NASA 1992); contained in the report on noise measurements taken during Delta launches (Keegan 1992); contained in the environmental assessment for the Taurus Standard Small Launch Vehicle Program (Taurus EA) (U.S. Air Force 1992) and its subsequent supplemental environmental assessment (Taurus SEA) (U.S. Air Force 1993); contained in the report on noise measurements taken during a Peacekeeper launch July, 1992 (McInerny 1992); contained in your August 31, 1992, letter to the Carlsbad Field Office of the Service; obtained during informal consultation between our staffs; and contained in our files.

Biological Opinion

It is the opinion of the Service that the proposed projects are not likely to jeopardize the continued existence of the California least tern or the western snowy plover. Critical habitat has not been designated for these species. Therefore, the proposed action would not adversely modify critical habitat.

Description of the Proposed Action

The Air Force proposes to launch vehicles from sites SLC-2W and 576E on Vandenberg Air Force Base (VAFB) during the California least tern and western snowy plover nesting season (between mid-March and mid-September). NASA requires a space launch azimuth of 190 degrees or greater to support polar and other high inclination orbits. The unique location of SLC-2W on VAFB provides a launch azimuth from 190 to 215 degrees. These orbits provide coverage of the entire planet for weather and earth resources surveillance, communications relay, defense, navigational systems, and other scientific purposes (NASA 1991). The Air Force proposes the Taurus launch in support of the U.S. Department of Defense space program and the Advanced Space Technology Program (U.S. Air Force 1992).

Standard Delta II vehicles are proposed to be launched from SLC-2W which is located north of the Santa Ynez River and east of La Purisima Point approximately 3000 feet inland of the Pacific Ocean. At least one launch is proposed during each nesting season in 1994, 1995, and 1996. However, as many as four launches may occur per nesting season. The SLC-2W is located approximately 2400 feet from a California least tern and western snowy plover nesting site (see enclosed map).

The SLC-2W consists of a launch pad and various support structures including: mobile service and fixed umbilical towers, blockhouse, and facilities for horizontal processing, the solid rocket motor, vehicle assembly, fueling, preflight checkout, and launch. The facility is currently being configured to launch a standard Delta II launch vehicle. These launch vehicles, facilities, and the proposed modifications to the facilities are described in the SLC-2W EA (NASA 1991).

The Air Force proposes to launch one Taurus vehicle from site 576E on VAFB during the California least tern and western snowy plover nesting season. Launch site 576E is located 3.2 miles north of the Santa Ynez River. It is approximately 6000 feet southeast of SLC-2W and an estimated 1200 feet inland of the Pacific Ocean. Launch site 576E is approximately 2600 feet from the California least tern nests and an estimated 2250 feet from the nearest western snowy plover nests (Allan Naydol, pers. comm., 1993).

Launch site 576E consists of an existing launch facility, concrete pad, and a 180-foot deep silo with underground access. The Taurus launch vehicles, 576E launch site facilities, and the proposed minor modifications to the launch facilities are described in the Taurus EA (U.S. Air Force 1992).

The SLC-2W SEA (NASA 1992) and Taurus SEA (U.S. Air Force 1993) contain the following mitigation and conservation measures which have been or will be implemented as part of the proposed action:

1. Acoustic measurements will be performed on the first available launch from SLC-2W and 576E and made available to the Service. Coordination will continue between the Air Force, NASA, and the Service.
2. Exhaust plume deposition will also be monitored on the first available launch from SLC-2W and 576E and the information gathered will be made available to the Service. Coordination will continue between the Air Force, NASA, and the Service.
3. The Air Force will enter into a Memorandum of Agreement with the Service to protect and enhance the California least tern habitat and population at VAFB.
 - a. The U.S. Department of Agriculture Animal Damage Control will monitor predation and conduct testing, evaluation, and development of ecologically sensitive, non-lethal predator control measures.
 - b. Habitat shelters (roof tiles) for the California least terns will be placed in the colony prior to the start of the 1993 nesting season. Roof tiles provide chicks protection from avian predation.
 - c. The wooden pole near the La Purisima Point least tern colony which could be used as a perch by avian predators will be removed.
 - d. California least tern decoys will be installed at the La Purisima Point colony and other appropriate areas at VAFB prior to the start of the 1993 nesting season.
 - e. The California least tern monitoring program will be increased from past levels to three days a week at all sites.
 - f. Aircraft will be restricted from flying within 1900 feet of the California least tern colony.
 - g. Emergency fuel jettison points for aircraft will be a minimum of two miles off shore.

Your letter dated August 31, 1992, contains the following additional mitigation and conservation measures which have been or will be implemented as part of the proposed action:

1. Launches will not occur during the California least tern nesting season when the wind is blowing toward the La Purisima Point colony.
2. The Air Force will provide funds to the Service in the amount of \$5,000 to fund scientific research on the impacts of noise to avian species.

3. The Air Force will provide funds to the Service in the amount of \$1,800 to purchase 125 California least tern decoys for placement at VAFB.
4. The Air Force will provide funds to Animal Damage Control in the amount of \$20,000 to provide the following for the La Purisima Point and San Antonio Creek colonies: monitoring and a report regarding the extent of predation; an evaluation of the effectiveness of non-lethal protection measures; and recommendations for predator control techniques.

Representatives from VAFB's Environmental Management staff and the Service have also discussed the need to establish a monitoring program for the western snowy plover on VAFB (James Johnston, pers. comm., 1993).

Effects of the Proposed Action on the Listed Species

Species Account

California least tern.

The California least tern was federally listed as endangered in 1970. Details of the life history, biology, and reasons for decline of the California least tern are contained in the 1980 Recovery Plan (U.S. Fish and Wildlife Service 1980) and are mentioned briefly here.

The California least tern is a bird of the family Laridae. It is one of 12 recognized subspecies of the least tern, three of which inhabit the United States. The breeding range of this subspecies is described as extending along the Pacific Coast from San Francisco Bay, California, to Bahia de San Quintin, Baja California, Mexico.

The California least tern measures approximately nine inches long and weighs roughly 1.6 ounces. Males and females look alike with a black cap, gray wings with black tips, orange legs, and a black-tipped yellow bill. Immature birds have darker plumage and a dark bill with distinctive white heads and dark eye stripes. It is a migratory species which arrives in California by late April to breed and departs to unknown southerly locations by late August. It nests on coastal, sandy, open areas, usually around bays, estuaries, and creek and river mouths. Nests are simply scrapes or depressions in the sand that the birds often adorn with small fragments of shell or pebbles. During the average 21 day incubation period the nest is tended continually. Both adults of a mated pair take turns tending the nest. This is followed by a period of approximately three weeks in which the adults tend the flightless but quite mobile chicks. After fledging, the young terns do not become fully proficient at capturing fish until after they migrate from the breeding grounds. Adults and fledglings usually leave the breeding colony within about 10 days of fledging.

This species was once common along the central and southern California coast. The precipitous decline of the California least tern is attributed to prolonged and widespread destruction and degradation of nesting and foraging habitats as well as increasing human disturbance to breeding colonies. Conflicting uses of southern and central California beaches during the

California least tern nesting season have led to isolated colony sites that are extremely vulnerable to predation from native, feral and exotic species, overwash by high tides, and vandalism and harassment by beach users. Since its classification as a Federal and State endangered species, considerable effort has been expended on annual population surveys, protection and enhancement of existing nesting colonies, and the establishment of new nesting locations. Control of predators constitutes one of the most crucial management responsibilities at California least tern nesting sites.

The nesting colonies in Santa Barbara and San Luis Obispo counties are a relatively small portion of the total state-wide population. However, they represent the only currently active breeding areas between Ventura County and San Francisco Bay. Monitoring efforts on VAFB have consisted of two visits per week to the La Purisima Point colony. One visit per week was made to the site north of La Purisima Point and to the Santa Ynez River mouth depending upon the presence of California least terns at those sites. The colony at La Purisima Point has ranged from zero to approximately 30 pairs that produced from zero to approximately 25 fledglings per year since 1978. In 1992, this colony consisted of 12 pairs that produced only one successful fledgling. It is believed that the major detrimental factor was the high rate of natural predation from coyotes (Perry 1992).

Western snowy plover.

The Pacific coast population of the western snowy plover was federally listed as threatened March 5, 1993, under the Act. Details of the life history, biology, and reasons for decline of the Pacific coast population of the western snowy plover are contained in Volume 58, Number 42 of the Federal Register (1993) and are summarized below.

The snowy plover is a bird of the family Charadriidae, in the order Charadriiformes, the shorebirds. This species is a small, pale-colored shorebird with dark patches on either side of the upper breast. Birds of the Charadriidae family are characterized by being compactly-built shorebirds that are thicker-necked than typical sandpipers. Their short pigeon-like bills, large eyes, and locomotory trait of short starts and stops further typify the family. Snowy plovers forage on invertebrates in the wet sand and among surf-cast kelp within the intertidal zone; in dry, sandy areas above the high tide; on salt pans; spoils sites; and along the edges of salt marshes and salt ponds. Little quantitative information is available on food habits.

The western snowy plover is one of the two recognized subspecies in North America. This subspecies breeds on the Pacific coast from southern Washington to southern Baja California, Mexico, and in interior areas of Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma and north-central Texas as well as coastal areas of extreme southern Texas, and possibly extreme northeastern Mexico. The Pacific coast population of the western snowy plover is defined as those individuals that nest adjacent to or near tidal waters, and includes all nesting colonies on the mainland coast, peninsulas, offshore islands, adjacent bays, and estuaries. They are believed to be genetically isolated from western snowy plovers breeding in the interior.

Twenty-eight breeding sites or areas currently occur on the Pacific coast of the United States. Two sites occur in southern Washington. Six sites occur in Oregon. Twenty plover breeding areas currently occur in coastal California. Eight areas support 78 percent of the California coastal breeding population: San Francisco Bay, Monterey Bay, Morro Bay, the Callendar-Mussel Rock Dunes area, the Point Sal to Point Conception area, the Oxnard lowland, Santa Rosa Island, and San Nicolas Island.

The Pacific coast population of the western snowy plover nests primarily on coastal beaches. Nesting habitat is unstable and ephemeral as a result of unconsolidated soil characteristics influenced by high winds, storms, wave action, and colonization by plants. Other less common nesting habitats include saltpan areas of wetlands, coastal dredge spoil disposal sites, salt evaporation ponds, and salt pond levees. Nest sites typically occur in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent. The majority of snowy plovers are site-faithful, returning to the same breeding site in subsequent breeding seasons. Birds often nest in exactly the same locations as the previous year. Double brooding and polygamy (i.e., the female successfully hatches more than one brood in a nesting season with different mates) have been observed in coastal California. After loss of a clutch or brood or successful hatching of a nest, plovers may reneest in the same colony site or move, sometimes up to several hundred miles, to other colony sites to nest.

Western snowy plovers breed in loose colonies with the number of adults at coastal breeding sites ranging from 2 to 318. The breeding season of the coastal population of the western snowy plover extends from mid-March through mid-September. Nest initiation and egg laying occurs from mid-March through mid-July. The usual clutch size is three eggs. Incubation averages 27 days with both sexes incubating the eggs. Plover chicks are precocial, leaving the nest within hours after hatching to search for food. Fledging (reaching flying age) requires an average of 31 days. Broods rarely remain in the nesting territory until fledging.

The coastal population of the western snowy plover consists of both resident and migratory birds. Some birds winter in the same areas used for breeding. Other birds migrate either north or south to wintering areas. The majority of the birds winter south of Bodega Bay, California. Many interior birds west of the Rocky Mountains winter on the Pacific coast. Birds winter in habitats similar to those used during the nesting season. Poor reproductive success resulting from human disturbance, predation, and inclement weather, combined with permanent or long-term loss of nesting habitat to encroachment of introduced European beachgrass (*Ammophila arenaria*) and urban development has led to a decline in active nesting colonies, and an overall decline in the breeding and wintering population of the western snowy plover along the Pacific coast of the United States.

Western snowy plovers have been counted on VAFB since 1980 and monthly counts of adults have been recorded from 1987 to November, 1992. Few data are available regarding the locations or numbers of the western snowy plover nests on VAFB. However, they are known to occur among the California least tern

nests at La Purisima Point and to extend further south on suitable habitat adjacent to La Purisima Point (Allan Naydol, pers. comm., 1993). This area will be collectively referred to as the La Purisima Point and south nesting area for the purpose of this biological opinion.

Analysis of Impacts

The launches proposed during the nesting season could cause the direct and indirect take of California least terns and western snowy plovers at the La Purisima Point nesting area as a result of the effects of launch noise and exhaust clouds. In general, launch noise could cause ear damage or a startle response. A startle response could potentially result in increased predation or the birds harming themselves. Acid deposition occurring as a result of the generation of a ground cloud could potentially burn birds, eggs, or chicks if the cloud reaches any nesting birds. The launch facility modifications, however, are sufficiently distant from the nesting area and are not likely to affect either of these two species.

Noise.

Space vehicle launches produce noise and vibrations that could potentially damage terrestrial and freshwater biota in the immediate vicinity of the launch site. Noise and vibration caused by a launch vehicle can affect broad areas but are usually of short duration because the vehicle gains altitude and accelerates quickly. Sounds generated from rocket launches originate from: 1) combustion noise radiating from the rocket motor chamber; 2) high velocity jet noise generated by the interaction of the rocket exhaust jet with the atmosphere; 3) combustion noise associated with the post burning of the fuel-rich combustion products exhausted into the atmosphere; and 4) sonic booms associated with the high velocities of the launch vehicles. The first three sources comprise the majority of the noise level in the immediate vicinity of the launch.

The SLC-2W SEA (NASA 1992) states that the sound level from Delta II space vehicle launches at SLC-2W is expected to be between 100 and 126 decibels (db) in the nesting area which is an estimated 2400 feet away. Sound levels above 100 db would last approximately five seconds. The Taurus EA (U.S. Air Force 1992) states that the overall sound pressure level (OASPL) contour for the Taurus launch at 576E is estimated to be 125 db at a distance of approximately 2600 feet from the source which is the approximate distance to the California least tern nesting area. The western snowy plover is potentially nesting approximately 2250 feet from launch site 576E. Table 2 from the Peacekeeper noise report (McInerny 1992) states that the OASPL is estimated to be 131 db at 2000 feet from the source. Because Taurus vehicles use a similar first stage engine as the Peacekeeper, nesting western snowy plovers may be exposed to an estimated 131 db OASPL.

Inadequate information is available with respect to the short- and long-term effects of noise on wildlife to fully assess the impacts that the subject launches may have on California least terns and western snowy plovers. However, a 1986 Delta launch at a SLC-2 site may have caused California least terns to abandon the La Purisima Point nesting site (U.S. Air Force 1989). As

stated in the SLC-2W SEA (NASA 1992) and Taurus SEA (U.S. Air Force 1993), noise may affect animals in several of the following ways:

1. Cause hearing damage or impairment (a temporary hearing threshold shift);
2. Trigger a startle response which can:
 - a. alter predator/prey interactions by alerting predators to prey locations or by leaving eggs or young temporarily vulnerable to predators;
 - b. cause damage to the animal, its eggs, or its young;
3. Mask biologically significant sounds such as predators;
4. Cause changes in distribution and abundance (provoke temporary or permanent emigration or separate colonies);
5. Affect growth and resistance to disease;
6. Reduce energetic efficiency;
7. Cause mortality; or
8. Induce reproductive failures.

A report on the effects of Minuteman launches on California least terns at the La Purisima Point colony noted a temporary startle effect on the terns from an unweighted sound exposure level of 104 db (Atwood et al. 1981). Overall, no long term or adverse effects on the birds were detected. Similarly, representatives from the Service, VAFB Environmental Management staff, and The Nature Conservancy reported no adverse effect to California least terns during a June 9, 1990, F-16 Thunderbird overflight at La Purisima Point that was recorded at 102 db (Michael McElligott, pers. comm., 1992).

Information gathered from the Taurus launch scheduled to take place during the nesting season of these two species will be used to ascertain impacts that may occur to the nesting birds at the La Purisima Point and south nesting areas. The implementation of predator control measures should significantly reduce the potential predation on California least terns and western snowy plovers associated with a startle response from noises generated from launches occurring at the SLC-2W and 576E launch sites.

Launch Emissions.

Aluminum oxide, hydrochloric acid, and nitrogen oxides are recognized in the SLC-2W EA (NASA 1991) and Taurus EA (U.S. Air Force 1992) as potentially hazardous emissions of a launch. NASA Technical Memorandum 83103 (1985) states that hydrochloric acid from Space Shuttle launches causes acute vegetation damage. Effects on wildlife may also be significant. In general, acid breaks down or denatures protein. The effects of the launch emission

could range from eye irritation to death in adults and could damage eggs depending on the level of acidity of the cloud and whether it reaches any nesting birds.

Delta II launch clouds extend from the launch point at a radius of 600-900 feet and persist for only a few minutes. The Taurus launch cloud radius was not predicted; however, it is likely to be larger than the Delta II radius because the Taurus is a larger vehicle. The Air Force has agreed to launch only when the wind is still or blowing away from the La Purisima Point nesting area. This should significantly reduce the potential for impacts to California least terns and western snowy plovers from launch cloud emissions.

The Service believes the impacts described above are not likely to jeopardize the continued existence of the California least tern and the western snowy plover. We present this conclusion for the following reasons:

1. The project description includes mitigation measures to minimize the take of individual California least terns and western snowy plovers.
2. The Air Force is undertaking conservation measures to enhance management of California least terns and western snowy plovers on VAFB. For example, the Air Force prohibits human intrusion on two important nesting areas on VAFB lands during sensitive breeding periods. The La Purisima Point and south nesting area is closed to public access from April 15 to August 31 every year for the purpose of protecting the California least terns. Approximately 3000 acres from north of La Purisima Point north to Shuman Creek and inland to the railroad tracks are also closed to human access. These closures provide protection from human intrusions on two important areas that support California least terns and western snowy plovers during the nesting season (Allan Naydol, pers. comm., 1993). These measures and the other conservation actions being implemented by the U.S. Air Force (pages 3 and 4 of this biological opinion) should decrease disturbance caused by predators or humans, and should result in more stable colonies. Stable colonies should be less likely to abandon the nest site than colonies that are frequently disturbed by predators and human activities.

Cumulative Effects

Cumulative effects are those impacts of future non-Federal (State, local government, or private) activities on endangered or threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 of the Act, and therefore, are not considered cumulative in the project.

The Service is aware of other projects currently approved or under review by the state, county, or local authorities where biological surveys have documented the occurrence of the California least tern and western snowy plover. These projects include coastal access and development issues. We do not anticipate that the action under evaluation in this opinion, considered

together with those non-federal actions of which we are aware, would significantly impair the ability of these species to survive and recover.

Incidental Take

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is permitted taking under the Act provided that such taking is in compliance with this incidental take statement. These terms and conditions are nondiscretionary, and must be undertaken by the agency or made a binding condition of any grant or permit, as appropriate.

The Service anticipates the following take:

1. A total of five (5) California least terns and/or western snowy plovers or their eggs in the form of direct mortality. Examples of direct mortality might include death from predation or acid deposition as a direct result of launch noises or emissions.
2. A total of one (1) temporary flushing of California least tern and/or western snowy plover colonies from their nests without signs of nest abandonment or death per year.

If, during the course of the action, the amount or extent of the incidental take limit is reached, the Air Force shall immediately notify the Service in writing. If the incidental take limit is exceeded, the Air Force must immediately cease the activity resulting in the take, and reinitiate consultation with the Service immediately to avoid further violation of section 9 of the Act. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). The Air Force should provide an explanation of the causes of the taking.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of California least terns and western snowy plovers from operation of SLC-2W and 576E launch sites during the nesting season:

1. Measures shall be implemented to reduce predation at the nearby La Purisima Point and south nesting area of California least terns and western snowy plovers that may result from launch noises.

2. Measures shall be implemented to reduce the potential effects of launch cloud emissions at the La Purisima Point and south nesting area of California least terns and western snowy plovers.

Terms and Conditions

The following terms and conditions are established to implement the reasonable and prudent measures described above.

1. The Air Force shall ensure that the following mitigation measures are implemented. These measures were developed by the Air Force and submitted to the Service with the request for formal consultation, in a letter dated August 31, 1992, and during telephone conversations with VAFB Environmental Management staff and have been slightly modified herein by the Service. Due to the extensive informal consultation that has occurred between the Air Force and the Service, many of these measures have begun to be implemented.
 - a. Acoustic measurements shall be performed on the first available launches from SLC-2W and 576E. The data from these measurements shall be made available to the Service. The Air Force shall provide funds to the Service in the amount of \$5,000 to fund scientific research on the impacts of noise to avian species.
 - b. Exhaust plume deposition shall be monitored on the first available launch from SLC-2W and 576E. The information shall be made available to the Service.
 - c. Launches from SLC-2W and 576E shall not occur during the California least tern and western snowy plover nesting season when the wind is blowing toward the La Purisima Point and south nesting area. This time period is from March 15 through September 15.
 - d. The Air Force shall manage the California least tern and western snowy plover populations in a manner that will increase stability and enhance reproductive success of these two species at VAFB. These measures shall include, but not be limited to:
 - 1) The California least tern monitoring program shall be increased from past levels of effort to three days a week at all sites. The western snowy plover monitoring program shall also be increased from past levels of effort to two days a week.
 - 2) Habitat shelters (roof tiles) for California least terns shall be placed in the colony prior to the start of the 1993 nesting season.
 - 3) The wooden pole near the La Purisima Point least tern colony which could be used as a perch by avian predators shall be removed.

- 4) California least tern decoys shall be installed at the La Purisima Point nesting area and other appropriate areas at VAFB prior to the start of the 1993 nesting season. The Air Force shall provide funds to the Service in the amount of \$1,800 to purchase 125 California least tern decoys for placement at VAFB.
- 5) The Air Force shall provide funds to U.S. Department of Agriculture Animal Damage Control in the amount of \$20,000 to provide the following for the La Purisima Point, San Antonio Creek and Santa Ynez River mouth nesting areas: monitoring and a report regarding the extent of predation; an evaluation of the effectiveness of non-lethal protection measures; and recommendations for predator control techniques.
 - a) The Air Force shall erect and maintain a new portable electric fence at the La Purisima Point nesting site prior to the 1993 nesting season to protect the colony from predators. The portable fence shall be constructed by placing brace posts in the ground as necessary. Round fiberglass rods shall serve as stays between the posts to keep the electric wires spaced properly no more than five or six inches apart. The wires shall be made of braided nylon wire that can be reused every year.
 - b) The Air Force shall install gates in the existing chain link fences prior to the 1993 nesting season to allow access to personnel from the Service, The Nature Conservancy, and Animal Damage Control for observations, monitoring, and investigations of the California least tern and western snowy plovers at La Purisima Point.
 - c) The Air Force shall repair existing fences where necessary near the La Purisima Point nesting site prior to the 1993 nesting season.
 - d) The existing electric fence near the La Purisima Point nesting site shall be cleared of vegetation and sand and repaired prior to the 1993 nesting season. The bottom wire shall not be over eight inches above the ground at any location.

2. The Air Force shall provide the Ventura Field Office with copies of all reports generated from the studies and monitoring requirements generated from these terms and conditions.

Disposition of Sick, Injured, or Dead Specimens

Upon locating a dead, injured, or sick individual of endangered or threatened species, initial notification must be given to the Ventura Field Office at (805) 644-1766 and the Torrence Law Enforcement Office at (609) 431-9440 immediately and in writing within three working days. The finder has the

responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. Notification must include the date, time, and location of the carcass, and any other pertinent information. Dead animals may be marked in an appropriate manner, photographed, and left on-site. Injured animals should be transported to a qualified veterinarian. Should any treated animals survive, the Service should be contacted regarding the final disposition of the animals.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term conservation recommendations has been defined as Service suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's responsibility under section 7(a)(1) for this species.

1. There is some indication that a 1986 Delta launch at a SLC-2 site may have caused California least terns to abandon the La Purisima Point nesting site (U.S. Air Force 1989). Therefore, the Air Force should avoid launching during the initial stages of the nesting season when abandonment is more likely to occur. This period begins approximately March 15 for western snowy plovers and April 30 for California least terns. Therefore, the Service recommends that no launches occur at the SLC-2W or 576E sites between March 15 and May 30. Careful pre-launch planning with this window in mind among the Air Force, NASA, and private industry could reduce any burdens this may place on users of the sites.
2. The Air Force should monitor sea otter populations at Purisima Point before and after SLC-2W and 576E launches.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Conclusion


This concludes formal consultation on operation of SLC-2W and 576E. Reinitiation of formal consultation is required if: 1) the amount or extent of incidental take is reached; 2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this biological opinion; or 4) a new species is listed or critical habitat designated that may

Mr. Mackey J. Real, Jr., Chief

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be affected by this action (50 CFR 402.16). Any questions or comments should be directed to Ms. Naomi Mitchell of my staff at (805) 644-1766.

Sincerely,

Acting for 
Craig Faanes
Field Supervisor

Enclosure

Literature Cited

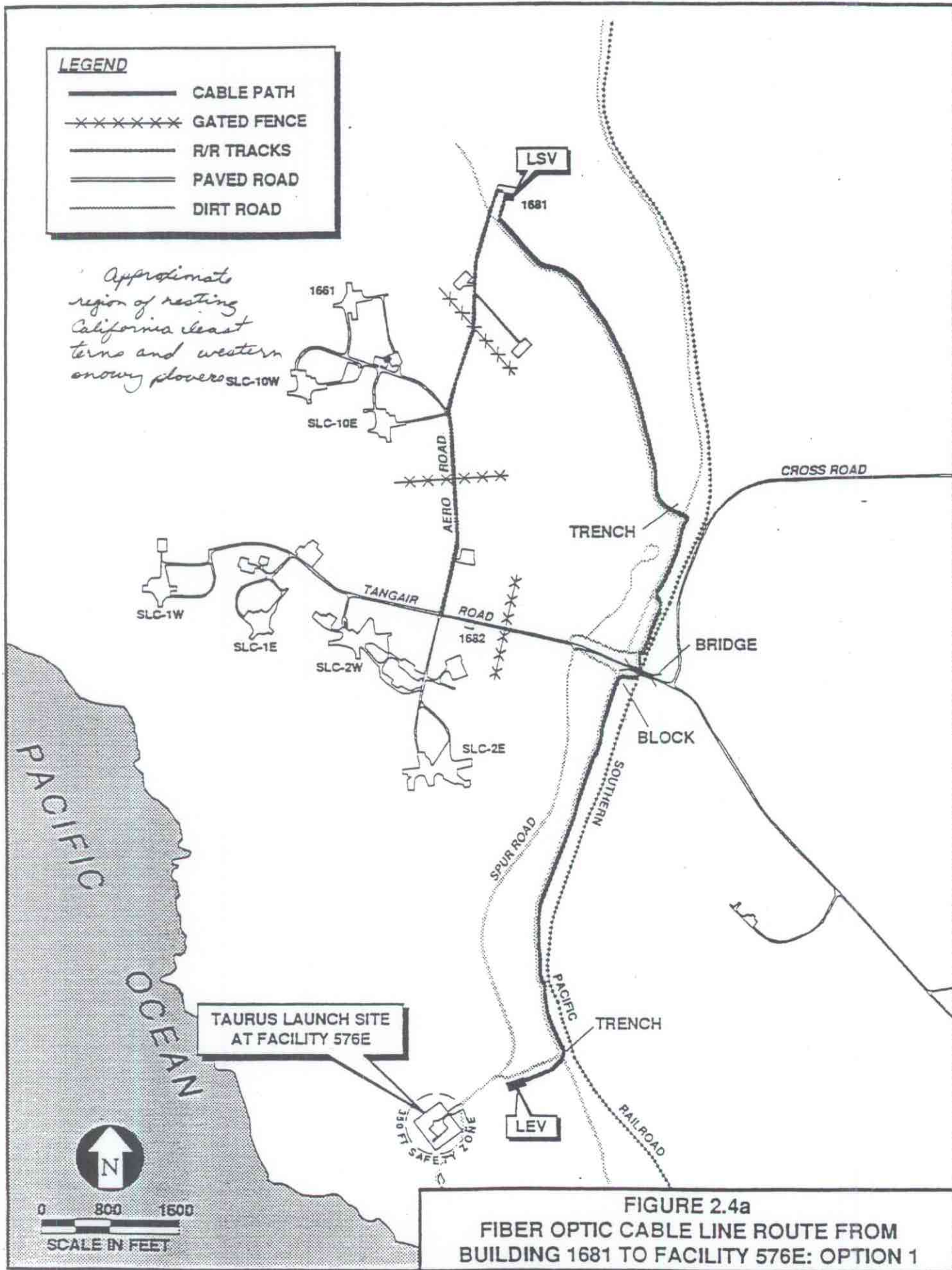
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Personal Communications

Johnston, James L. 1993. Chief, Environmental Planning, Environmental Management. Vandenberg Air Force Base.

McElligott, Michael. 1992. Wildlife Biologist. Vandenberg Air Force Base.

Naydol, Allan V. 1993. Chief, Natural Resources, Civil Engineering. Vandenberg Air Force Base.



CALIFORNIA COASTAL COMMISSION

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July 3, 1992



Colonel R.P. Jones
Environmental Management
Department of the Air Force
Headquarters 30th Wing (AFSPACECOM)
Vandenberg Air Force Base, CA 93437-5000

RE: ND-49-92, negative determination for conducting a new space launch program
at Vandenberg Air Force Base

Dear Colonel Jones:

The Coastal Commission staff has received the negative determination for the above-referenced project. The project involves the establishment of a new space launch program at Vandenberg Air Force Base, Santa Barbara County. The launches are to be conducted from an existing site on North Vandenberg just south of Purisima Point. There will be no construction above ground level at the site, only a concrete pad and some minimal soil compaction within the present site fence. All launch equipment will be mobile and temporary, and will be present on site for about 14 days. Fiber optics cabling will be temporarily laid along existing road shoulders, on the surface, to connect the launch facility with remote control facilities and range control.

Your negative determination indicates that the project has the potential to affect public access to and recreational use of the coast. The project will result in temporary closure of small base beach immediately west of the launch site and Ocean Beach Park to the south. These beaches will be closed for approximately 24 hours for each launch. As described in previous communications with your agency, the Commission staff is concerned about the affect of missile launches on public use of nearby beaches. Most of northern Santa Barbara County's beach are not accessible to the public. The few beaches that are available for public recreational use are regularly closed during the Air Force's missile and space launching activities at Vandenberg.

The Commission staff believes that the closure of a public beach is an activity that affects the coastal zone, and thus could require a consistency determination. However, the Commission recognizes that launch activities have been occurring at Vandenberg Air Force Base for many years and these activities have historically resulted in beach closures. The Commission staff recognizes the historical closures as an existing constraint on public access and recreational resources in this area. The Commission staff reviews access impacts from new launch activities in the context of this existing constraint. According to a letter recently written to the Commission staff from the Air Force, dated March 19, 1992, from Colonel Jones to Peter Douglas,

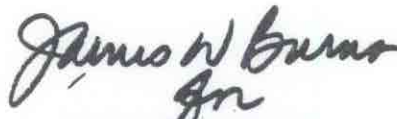
PAGE 2
JULY 3, 1992

the historical launches at Vandenberg have averaged 49 launches per year. The average launches have dropped significantly in recent years. Over the past 15 years, the average launches have dropped to 21 launches per year, and over the past 10 years, the average launches have dropped to 16 launches per year.

Since the current average launch activities at Vandenberg are significantly below the historic levels and since the proposed project allows for only three launches per year, the impact from this space launch program will not significantly affect public access and recreational resources in the coastal zone. In addition, the proposed project will not affect environmentally sensitive habitat, visual, or water quality resources of the coastal zone. Therefore, the Commission staff concurs with your negative determination made pursuant to 15 CFR Section 930.35(d).

Thank you for your cooperation on this matter. Should you have any additional questions, please contact James Raives of the Commission staff.

Sincerely,


PETER M. DOUGLAS
Executive Director

cc. South Central Coast Area Office
NOAA Assistant Administrator
Assistant General Counsel for Ocean Services
OCRM
Department of Water Resources
Governor's Washington D.C. Office

PMD/JRR
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ETN 42-3-2



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration REQ
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 W. Ocean Blvd., Suite 4200
Long Beach, CA 90802-4203

AUG 07 1992

F/SWO31:LA

Colonel R.P. Jones
Director
Environmental Management
Department of the Air Force
Headquarters 30th Space Wing (AFSPACECOM)
Vandenberg Air Force Base, CA 93437-5000

Dear Colonel Jones:

This letter responds to your request for informal consultation pursuant to Section 7 of the Endangered Species Act for the proposed Taurus Standard Small Launch Vehicle Program at Vandenberg Air Force Base. Based on the draft Environmental Assessment, this program is not expected to adversely affect listed marine mammal species occupying the Channel Islands.

However, the close proximity of the proposed launch area (site 576 East) to the Purisima Point haulout and breeding area for harbor seals and California sea lions, and the predicted noise levels near the launch area, suggest these species may be unintentionally harassed by launch events. Although harassment of marine mammals may be unintentional and incidental to the Taurus Program launch activity, it is nevertheless prohibited by the Marine Mammal Protection Act (MMPA) unless authorized by small take regulations issued by the National Marine Fisheries Service (NMFS) pursuant to Section 101 (a)(5) of the MMPA.

Since marine mammals may be harassed by the proposed Taurus Program launch events, we strongly recommend the Air Force design and implement a monitoring program to monitor noise levels and behavioral responses of marine mammals at the Purissima Point and Rocky Point haulout areas during Taurus Program launch events. If this monitoring program demonstrates that marine mammals are being harassed or taken in any manner by Taurus launch events, the NMFS will recommend the Air Force request issuance of small take regulations pursuant to Section 101 (a)(5) of the MMPA so that the unintentional, non-lethal harassment of these marine mammal species may be authorized. We are prepared to meet with you to discuss the scope of this monitoring program.

This concludes Section 7 consultation informally for the proposed Taurus launch program. Consultation must be reinitiated if: (1) new information reveals impacts of the project that may affect listed species in a manner or to an extent not considered in the Environmental Assessment; (2) the identified activities are



modified in a manner that causes an adverse effect on listed species; or (3) a new species is listed or critical habitat is designated that may be affected by the proposed activities.

If you have any questions, please contact Mr. Craig Wingert at (310) 980-4015, or Ms. Lana Andreeva at (310) 980-4094.

Sincerely,

Gary Maclock

for E.C. Fullerton
Regional Director

ETN 21C-2
Taurus

STATE OF CALIFORNIA — THE RESOURCES AGENCY

PETE WILSON, Governor



Rob
TAKA TV

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
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21 May 1992

Reply to: USAF 920421A

Col. R.P. Jones
Director of Environmental Management
Headquarters, VANDENBERG AIR FORCE BASE CA
93437-5000

Subject: SSLV:TAURUS PROJECT

Dear Col. Jones:

Thank you for requesting my review of the undertaking noted above and for including the documentation which justifies your determination.

I concur in your determination that there are no historic properties in the Area of Potential Effects for this undertaking. Accordingly, you have fulfilled federal agency responsibilities pursuant to 36 CFR 800, the regulations implementing Section 106 of the National Historic Preservation Act. Please note that your agency may have additional responsibilities under 36 CFR 800 under any of the following circumstances:

1. If any person requests that the Advisory Council on Historic Preservation review your findings in accordance with 36 CFR 800.6(e);
2. If this undertaking changes in ways that could affect historic properties [36 CFR 800.5(c)];
3. If previously undocumented properties are discovered during the implementation of this undertaking or if a known historic property will be affected in an unanticipated manner [36 CFR 800.11];
4. If a property that was to be avoided has been inadvertently or otherwise affected [36 CFR 800.4(c); 800.5];
5. If any condition of the undertaking, such as a delay in implementation or implementation in phases over time, may justify reconsideration of the current National Register status of properties within the undertaking's Area of potential Effects [36 CFR 800.4(c)].

Thank you for considering historic properties during project planning. If you have any questions, please call staff archaeologist Nicholas Del Cioppo at (916) 653-9696.

Sincerely,

Steade R. Craig, AIA, Acting
State Historic Preservation Officer

